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CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL SECTION

STRATEGIC OUTLOOK ON END-USER TRAINING:

How To Achieve Your Personnel Best

Chase Manhattan Corp.'s
Craig Goldman

AN INTERNATIONAL DATA GROUP PUBLICATION

Dennis Givens, Director of Information Systems, left; Albert Herrington, Communications Manager

DIGITAL. THE

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ST. JUDE HOSPITAL RELIES ON DIGITAL TO HELP IT SAVE MORE THAN INFORMATION.

As one of the world's preeminent research and care facilities for childhood cancer, St. Jude Children's Research Hospital is on the front line in the battle against this devastating disease. And the hospital's most powerful weapon, it has found, is information.

"Our goal is to perform the type of research that will make a difference in the battle," said Dennis Givens, Director of Information Systems.

With that as its mission, the hospital's ability to create a free and efficient flow of information is all the more essential to its purpose.

"That ability helps us recruit and retain top researchers," Givens said. "And it promotes the exchange of research results with outside colleagues, which helps us impact patient-care worldwide."

That ability, however, was not always there. As Communications Manager Albert Herrington said: "We wanted to build an environment where systems were not stumbling blocks to doing research. But a lack of integrated computing resources hampered us."

"Compounding the problem is the fact that we track patients for years," Givens added. "And each one has hundreds of records generated by doctors, biostatisticians, psychologists, pathologists, pharmacists, the list goes on."

So the hospital set out to find a computing platform that would give researchers portability and interoperability across the different systems already being used by the hospital and its collaborators. One that was rich in applications. And one that had a flexible growth plan.

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"Digital kept popping up as the only choice," Herrington said. "Everything's already there – the applications, the scalability, the ability to connect. You decide what you want to do and then just do it."

"Digital is a solutions vendor," Givens said. "They recommended what was best for our specific problems – and in some cases, that even meant they recommended someone else's equipment."

"Our researchers can now access information across different systems and assemble documents in hours that once might have taken days," Herrington concluded. "Getting information that much faster helps them and St. Jude reach their goal that much faster."

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VOLUME 5, NUMBER 18

STRATEGIC OUTLOOK END-USER TRAINING

No Train, No Gain 35

Your average technology implementation's woebegone stepchild has traditionally been training. But organizations are finally wising up to the costs of neglect.

By Meghan O'Leary

Banking's class act **48**
Cover photo by John Rae

The Classless Society 42

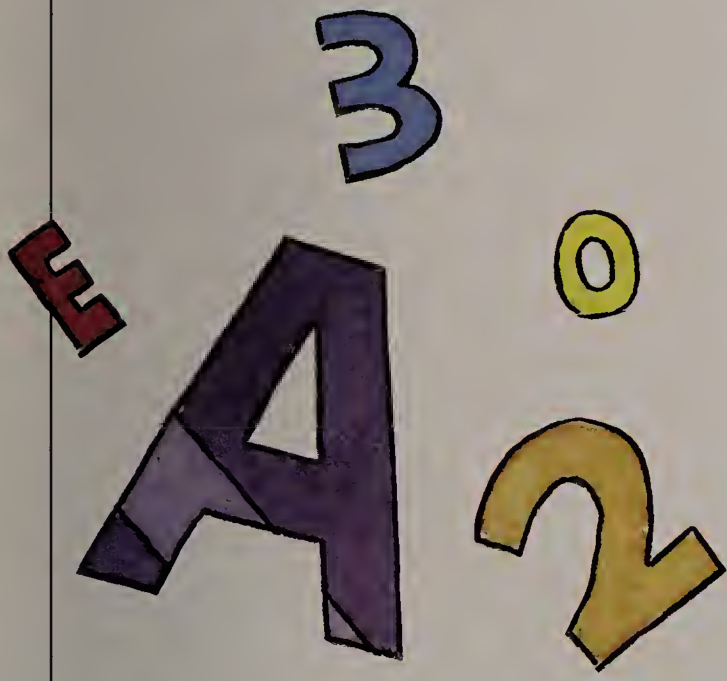
Frustrated by the tedium and expense of traditional classroom training, some companies are looking for newer, sexier ways to educate end users.

By Richard Pastore

Achieving Its Personnel Best 48

Chase Manhattan is building a smart user base by breaking down walls between business and technology training.

By Richard Pastore



Teach your users well **35**

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To Market, To Market 52

As product life cycles diminish, companies selling everything from integrated circuits to fresh pizzas must get their goods to consumers more quickly.

By Kathleen Melymuka

M O R E ▶ ▶ ▶

Learning from fast experience **52**

People have always b together. Unfo computing envir

The good news, however, is there's a solution. Lotus Notes® software. A breakthrough technology that's helping organizations overcome the technological roadblocks found in most mixed computing environments, which often stop good ideas from ever going anywhere.

You see, Lotus Notes is a flexible workgroup computing environment that signals a better way for end users to work together… while giving IT and MIS professionals a better way to more effectively leverage their company's existing hardware, software and network investments.

Let's face it. Many companies have spent fortunes on technology over the years and have begun to wonder just how well it's paid off. With Notes, the benefits are immediate. Companies can finally begin connecting people and ideas for more informed decisions. Regardless of group size, location or network configuration.

What's more, Notes is an extremely flexible environment that makes the development and deployment of all kinds of custom applications a relatively quick and easy process. Some typical applications include lead tracking, product planning, brainstorming, account management, reference libraries, call reporting, quality management and more. There are small and large companies, in fact, that have bought Notes to solve a specific problem, only to discover that it answered other needs as well.

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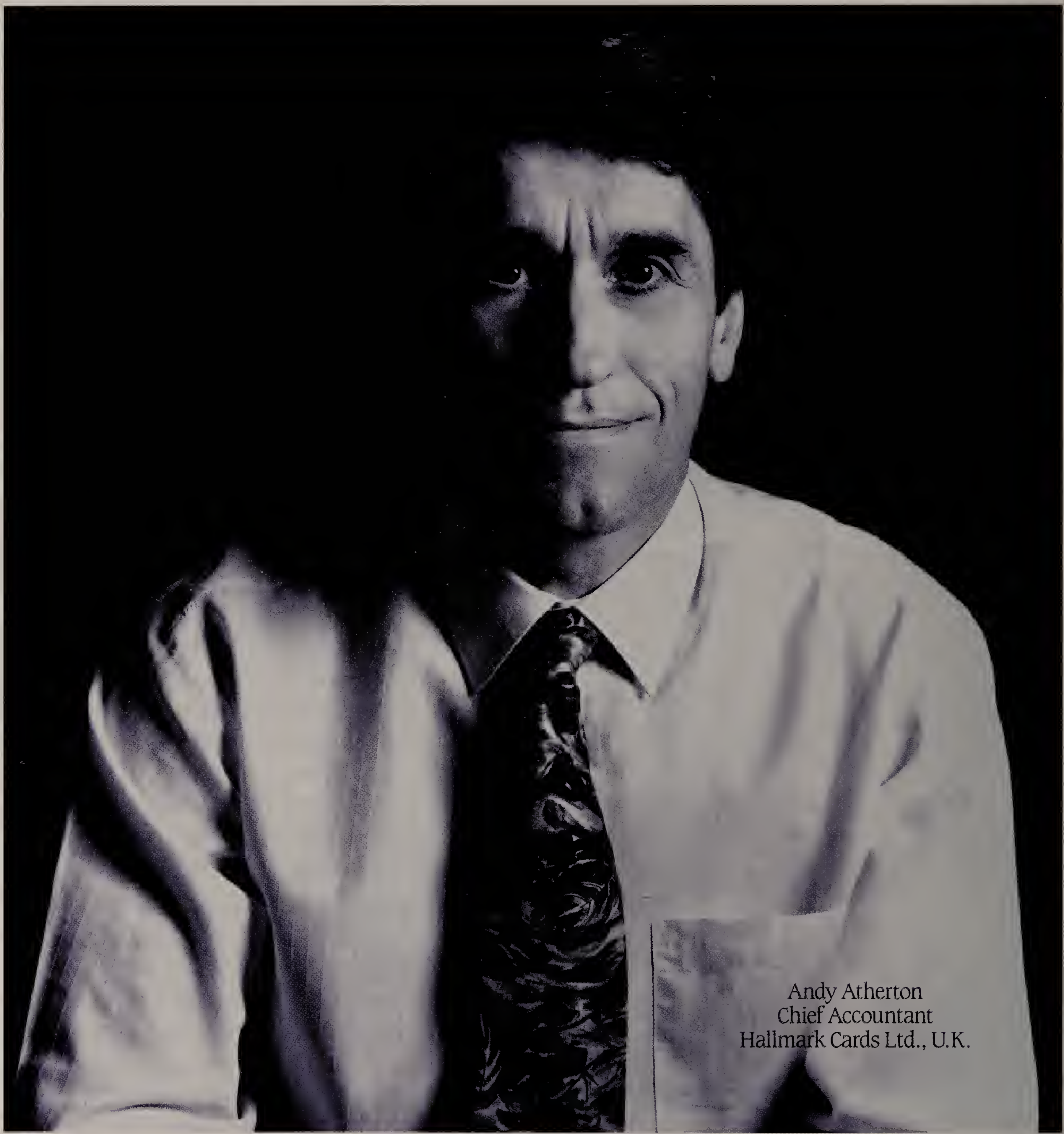

Andy Atherton
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CIO

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COLUMNS

INSIGHTS: FUTURE IMPERFECT 22

Nobody can know the future, but IS executives must have some pretty good ideas about it. With thousands of people clamoring to sell you their vision of things to come, whom do you trust?
By Michael Marien

FIRST PERSON: ALL IN I.T. TOGETHER 26

An IS executive describes how his company is straightening out the kinks in the supply chain by reaching beyond EDI toward intercorporate information-sharing.
By Gerald Long

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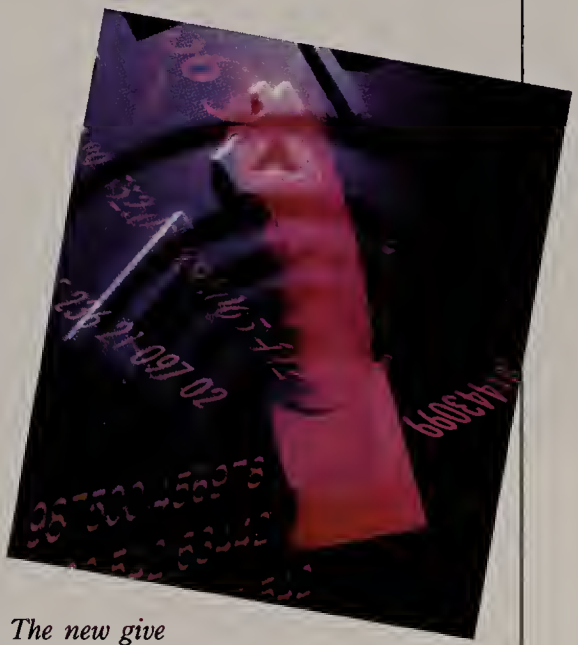
Two words describe the latest trend in online transaction processing: open and distributed.
By Alice LaPlante



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Health-care homing devices **14**

The success of a particular system is often measured by the ability of users to make effective use of it and understand its value to the enterprise's overall business objectives. And yet when it comes to cutting the budget, the line item for IS end-user training can be an attractive target.

Complicating matters, CIOs usually do not control the training process, which at many firms is handled by human resources or end-user departments. Yet many information executives consider their involvement in managing training critical to the IS effort.

This month's Strategic Outlook, prepared by Senior Writers Meghan O'Leary and Richard Pastore, examines the variety of approaches organizations are taking to get the training job done cost-effectively. (Please see articles beginning on Page 35.)

It appears that many organizations are relying on third-party training firms rather than making heavy investments in in-house technology training. This enables a flexible approach to providing training for a diverse menu of technologies.

Three of the more interesting approaches to training are peer training, local training coalitions and shadow development. In the first case, employees already trained for a particular application mentor untrained employees. Some companies band together in training coalitions in order to negotiate significant discounts from training providers. Shadow development involves users, trainers and IS professionals in a process designed to make training a component of the systems-development process.

Companies don't want to overtrain employees with features of applications they may never use. Enter the concept of just-in-time training, an offshoot of computer-based training that puts training on the desktop and lets employees refresh learning as needed. And organizations that don't want to send employees away to remote sites for training are seriously exploring videoconferencing.

Our profile of Chase Manhattan shows that taking an active and visible role in the training process is yet another opportunity for information executives to impress the business value of IT upon the enterprise.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL

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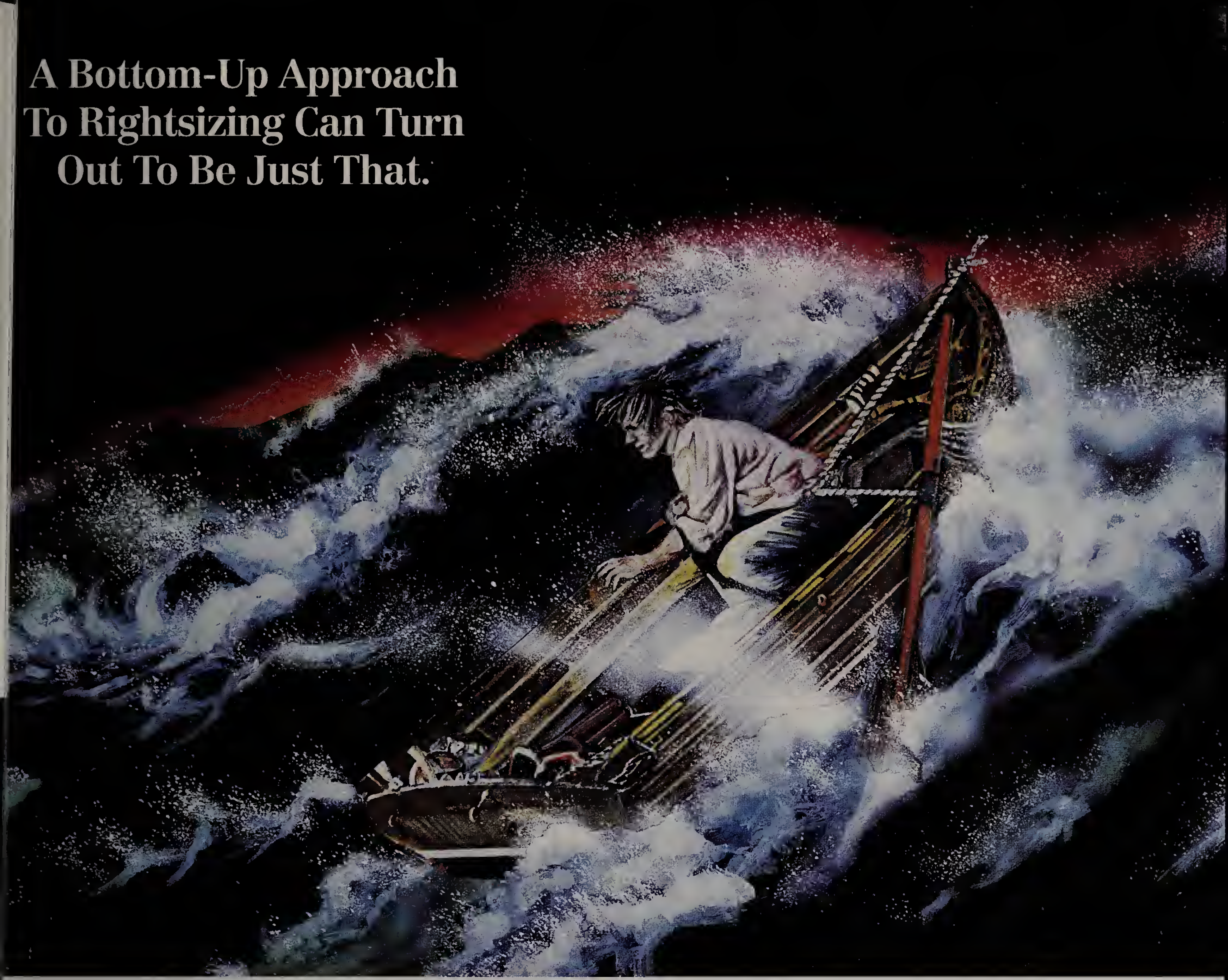

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LETTER FROM THE PUBLISHER

PHOTO BY GEORGE SIMIAN

As reported in this issue of *CIO*, organizations are coming to regard end-user training as of primary importance rather than an afterthought. Given this growing emphasis on education, numerous third-party companies have sprung up to help CIOs and corporate training departments provide a range of technical instruction in and out of the classroom.

Many computer and software vendors have also developed training products and services for their customers. Their rationale for entering this market? Nobody knows their products better than the people who created them.

Sounds logical. But our research indicates that vendor-sponsored training gets the most-mixed reviews of any educational alternative. Unfortunately, the current perception is that technology vendors spend too much time emphasizing their products' good points and downplaying their faults, leading customers to conclude that independent companies represent the less-biased choice for outside training support.

I believe that vendors are best qualified to teach end users about their own products. But to ensure their future success in the training arena, vendors will have to build their credibility among prospective customers.

They should begin by consulting with CIOs and end users in order to design a curriculum that reflects how their products will be used in the real world. Vendors can also boost their credibility by presenting both the strengths and shortcomings of all products, as well as planned enhancements. In addition, vendors can take the lead in suggesting how to measure training's return on investment, developing methods to gauge such factors as end-user retention and productivity gains.

The challenge is to become an ally to CIOs and corporate IS trainers who must implement education solutions, but who may lack a specific expertise. By positioning themselves as training partners, ensuring that educational materials match real-world needs and providing a positive—but balanced—picture of their products' capabilities, vendors *can* gain new credibility—and new business—in the growing training market.

P.S. There is still time to register for our next CIO Perspectives Conference, "The Process of IT: Organizing for Success," to be held Oct. 11-14 at the Boca Raton Resort & Club. To enroll immediately, please call us at 800 366-0246.

Coming In CIO

TV's Retail Channels

The Home Shopping Club's wildly successful brand of electronic retailing relies on real-time coordination of products, pitching and pricing supported by a tightly integrated network of telephones and computers. Driving that technology is a closely-knit management team that invents daily the industry their company dominates.

To Downsize or Not to Downsize?

Speed is of the essence when it comes to making downsizing decisions. Organizations have only about six months to decide on a course of action that could cost them millions—or save them from extinction. Sound reasoning will create a road map to a cost-effective computing environment, while faulty reasoning could lay the groundwork for disaster.

Pen Points

Since 1989 rudimentary pen computers have been replacing pen and paper as data-collection tools, and today a second generation of these systems is making its debut. To accommodate the increasing demand, a community of vendors, systems integrators and application developers is growing up around pen technology.

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TRENDLINES

SYSTEMS DEVELOPMENT

MISSED OPPORTUNITIES?

Systems development managers may be missing the best practices boat, according to CSC/Index's latest Index Summit survey. Despite the fact that they are under more pressure than ever from senior business executives to deliver strategic applications quickly and to quantify the value of their projects, the Cambridge, Mass., consultancy reports that very few of these managers are using or exploring tools and techniques for better systems development, such as CASE, joint application design (JAD) or self-directed teams.

The consulting firm asked 216 systems development managers in North America and Europe to rank their most critical development issues. (Eighty percent of respondents were the highest-ranking systems development executives in their organizations.) For North American managers, the top three issues were responding rapidly to system requests, increasing developer productivity and identifying and developing strategic systems.

Nevertheless, only 33 percent of those surveyed in the United States (65 percent in Europe) reported using CASE tools; 42 percent (26 percent in Europe) used JAD techniques; and 20 percent (17 percent in Europe) used self-directed development teams. In addition, only 32 percent (45 percent in Europe) are reusing code, and none of the respondents reported working with business simulation tools. In fact, implementing CASE tools and overcoming development staffs' resistance to new methods both fell in importance from last year's study.

Highlighting the danger of IS lethargy on systems development is the finding that fewer than half of respondents' IS development projects were completed on time and within budget. A major reason for this disappointing figure is companies' unwillingness to abandon projects, the survey found. (Only 22 percent of respondents reported abandoning three or more projects a year.)

The authors of the study may be missing the point of their own findings. Despite heightened demand for speedy, effective systems development and increased availability of proven methods for improving productivity, systems development executives don't seem to be taking the problem or the solutions seriously enough. ■

FAX FROM HECK

One recent morning we received Moby Fax, also known as "The Great White Fax" because of the snowy blankness of most of its pages. Happily, in its wake came a stirring example of corporate forthrightness, coupled with an admirable instinct for customer placation. SprintFAX, the division of Sprint TeleMedia that errantly appended 32 blank pages to the end of its client's newsletter (about which more later), that afternoon faxed us an apology, an inscrutable reference to the "unique technical problem" that was to blame, and an offer to buy us some new fax paper and treat us to 30 minutes of free long-distance service. Well done, SprintFAX.

ILLUSTRATION BY BETHANY GULLY

Sarah Stambler, editor and publisher of *Marketing With Technology News*, the exclusively fax-delivered newsletter 230 of whose subscribers were treated both to Moby Fax and to the subsequent apology, professes herself satisfied with the SprintFAX response. In fact, she said, the apology letter itself elicited more than 60 subscription inquiries.

MWT (see "Trendlines," *CIO*, August 1992) is a recently-launched monthly newsletter that covers marketing strategies that rely on alternative electronic media such as videotex, audiotex, FM subcarrier, cellular communications and, of course, fax. Subscriptions to *MWT* are $99 a year. *MWT* can be reached at 212 222-1765 (voice) and 212 678-6357 (fax). ■

NEW INKLINGS

If you're having trouble keeping up with all those computer conferences, shows and seminars, two new publications from Guidelines could come in handy. On the theory that reading about it is the next best thing to being there, the *Conference Analysis Newsletter* reports on more than 20 events each year, providing details on presentation quality, conference content and attendee reaction. The newsletter also advises readers on which conferences should not be missed and which should be avoided. An annual subscription costs $395. The *Computer Conference Calendar* lists more than 350 worldwide events each year. Subscription price is $35 dollars for six two-month issues. For further information call 215 234-4449.

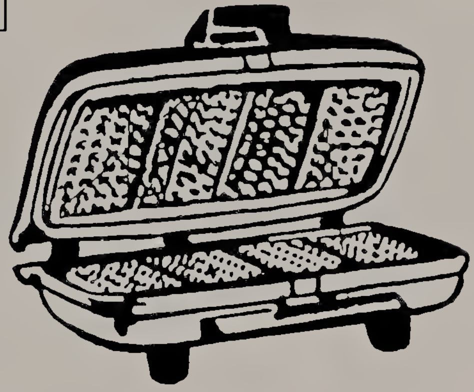
Trade Dimensions, a provider of information on supermarkets, convenience stores, wholesale clubs, mass merchandisers and chain drug stores for the packaged-goods industry, has begun publication of *Sales & Marketing Technology*. According to Publisher Harold Clark, the quarterly newsletter will "collect and review information on the related technologies that are available from all vendors so that sales and marketing professionals can quickly match available resources with their needs." The premier issue is devoted to micromarketing. Complimentary subscriptions are available by writing Clark at: Progressive Grocer's Trade Dimensions, Four Stamford Forum, Stamford, CT 06901, 203 325-3500. ■

Is it possible for your mainframe applications to run on anything else?

A

I doubt it. The Big Iron is where it's at. I've got too much tied up in mainframes to waste time on small platforms.

B



I'm still waffling. I won't commit until smaller platforms are proven in the business environment.

C

Hey, I'm a big fan. I'm already doing it. MIPS are cheap.

D None of the above.

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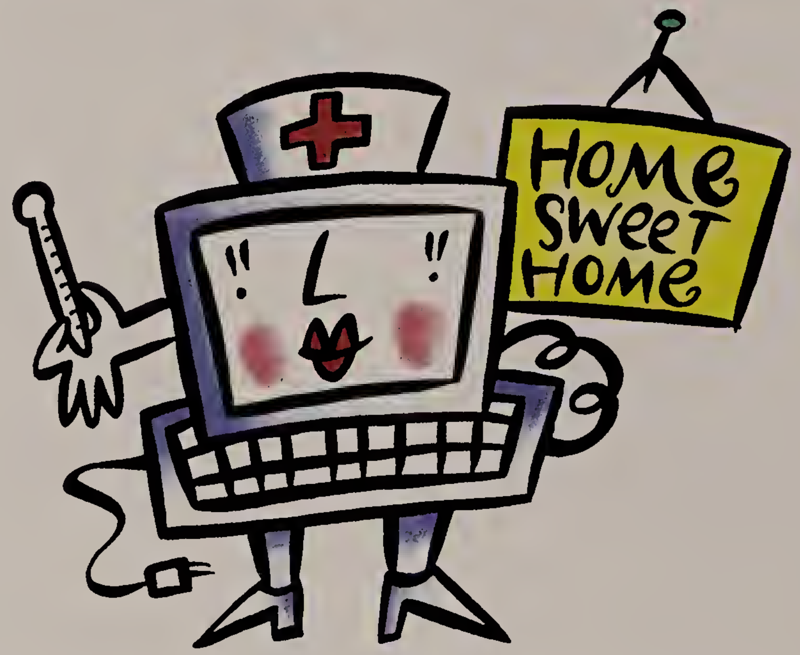
HEALTH-CARE ECONOMICS

The Bright Side of Homesickness

The nationwide scourge of bloated health-care costs is probably not susceptible to a simple, one-fell-swoop cure; the problem is much too big for that (try nearly $800 billion annually, 13 percent of the gross national product). But a recent study by Arthur D. Little, the Cambridge, Mass.-based consulting firm, prescribes some straightforward IT remedies that ADL says will shrink the bloat by at least $36 billion annually. And that ain't hay.



According to the study, the lion's share of the savings—some $30 billion—can be achieved using technology to support a new kind of house call—home health care. The goal is to "outsource" as much patient care as possible from costly hospitals to the patients' homes.

IT-supported home health-care services can take many forms, but all emphasize meeting patients' needs in the least costly way that still preserves the quality of care. For example, some hospital stays can be shortened if patients have the means to self-administer, and then communicate the results of, tests that would otherwise have to be done with hospital staff assistance. Home-based terminals can also monitor and transmit vital signs. And many routine patient inquiries that doctors now field could be handled by dial-up expert systems (though the report respectfully acknowledges the irreplaceability of the doctor-patient relationship).

Besides simply swapping post-operative care from hospital to home, the report suggests, early-intervention home-care applications could prevent at-risk patients from allowing conditions to progress to an acute stage before seeking treatment. Home terminals can provide easy health-care access to patients who might otherwise be reluctant to call or visit a doctor.

The net effect of these initiatives is ongoing health maintenance. "By providing patients with technologies that support and foster self-care, patient education and early intervention . . . fewer medical problems [will] become serious," said Mark K. Schneider, one of the authors of the report.

Besides home-care technologies, the ADL study projects significant annual savings from electronic claims processing ($6 billion), electronic inventory control ($600 million), and videoconferencing ($200 million).

The study was sponsored by eight major telecommunications companies: Ameritech, Bell Atlantic, BellSouth, Northern Telecom, NYNEX, Pacific Telesis Group, Southern New England Telephone and Southwestern Bell Corp. ■

The O.S. Open

Director of Defense Information Paul Strassman issued a challenge to the IS industry to develop a multivendor open systems environment that will run basic applications in a day-to-day operation. That challenge has been accepted, and the contestants will prove their mettle in the Interoperability Olympics, to be held at the 1992 Federal Computer Conference (FCC) in Washington Dec. 8-10.

This cooperative endeavor will comprise the systems of minicomputer, front-end processor, database server and multimedia platform vendors—all interconnected into a whole known as FCC OpenNet '92. That conglomerate will attempt to run practical applications such as text communication, spreadsheet sharing and shared database access.

Strassman also requires that the network demonstrate its ability to support a field-deployed node that can be attached and operational within 10 minutes.

Arlington, Va.-based National Trade Publications Inc., which produces the Federal Computer Conference, said it expects Strassman to be on hand to personally put the OpenNet through its paces. ■

Heard But Not Seen

IBM is giving a new voice to blind computer users.

That voice is a speech synthesizer which enables blind and visually impaired people to use the GUI that comes with IBM's OS/2 operating system. The new product, Screen Reader/2, converts code for graphics-based software into information voiced by a speech synthesizer so users can actually hear the contents of their computer screens, including non-text items such as icons.

An earlier IBM product converted words and numbers into speech. But the company said it created Screen Reader/2 because blind computer users had expressed concern about being able to run programs that use graphical representations of files, printers, shredders and other objects.

Screen Reader/2 was developed with input from approximately 50 blind computer users at IBM and other companies, government agencies and schools. The product also serves sighted users who want to hear rather than read screen information. ■

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No matter how many hours you've spent in airplanes, and most of us have spent plenty, you never feel totally safe. As the joke goes, they may kill you, but they probably won't hurt you.

But beginning in 1995, domestic fliers will have good reason to feel more secure. That's when a new national communications network designed to enhance air-travel safety is scheduled for full implementation. MCI, which won the Federal Aviation Administration contract last spring, recently unveiled its plans for the network and announced that the system should be operational in the Seattle region early next year.

The FAA contract calls for a highly reliable backbone network with 99.999 percent availability. That's like "the Redskins losing one game in 16,250 seasons," explained an MCI spokesman.

In response, MCI's Leased Interfacility National Air Space Communications System (LINCS) was engineered with significant redundant communications capability and media diversity to ensure uninterrupted communications, according to the company. Composed of fiber optic and terrestrial microwave technologies, the system can restore service in an average of 20 seconds in case of an outage.

"Severe network failures during 1991 showed the vulnerability of the existing air-traffic-control communications infrastructure," said Daniel F. Ackerson, MCI's president and COO. "These outages left air-traffic controllers impaired and highlighted the need for a system that could not be compromised."

EVENTS

EDIA's 24th Annual EDI Users Conference and Exhibit

Opryland Hotel, Nashville, Tenn.
October 5-7
The Electronic Data Interchange Association
703 838-8042

Most organizations need to undergo a comprehensive reengineering process to remain competitive. This conference addresses the way job designs, work flows, control mechanisms, organizational structures and systems requirements must be addressed if EDI is to achieve its full potential. Registration fees: $550 to $850.

Working Toward a Competitive Global Vision

Atlanta Marriott Marquis
October 7-10
Association for Manufacturing Excellence
404 521-0000

This conference will focus on competitive product design, customer satisfaction and integrated management of the enterprise. Speakers provide first-hand information about world-class performance improvements and related concepts. Optional activities include plant tours of Milliken, NOK and Ford. Registration fees: $695 for members; $820 for nonmembers.

The Process of IT: Organizing for Success

Boca Raton Resort & Club,
Boca Raton, Fla.
October 11-14
CIO Publishing Inc.
800 366-0246 or 508 872-8200

This conference targets the three issues that successful information technology management must address: infrastructure, enabling technologies and management and control. Panel discussions focus on IT as the business-process change enabler and on pioneering new operating models. Registration fees: 1,195-$2,250.

The Electronic Mail Association's Annual Conference

Fairmont Hotel, San Francisco
October 24-25
The Electronic Mail Association
703 875-8620

This conference looks at the current state of electronic messaging and explores opportunities for growth and advancement in the future. A new plenary session focuses on electronic messaging in the year 1995. Pre-conference tutorials will guide participants in practical applications. Registration fees: $245 to $1,385.

I Shave at the Office

Home used to be the place you hung your hat. But increasingly, it's also where you write reports, process paperwork and follow up sales leads.

The number of workers who telecommute more than 35 hours each week from a home office is expected to double by 1995, according to a recent survey by LINK Resources in New York.

To take advantage of this trend among mid-sized and large companies, MCI's Eastern Division in Rye Brook, N.Y., has launched a new Telecommuting Consulting Service. MCI is targeting companies with large sales forces that work from home full- or part-time or that have plans to set up formal telecommuting programs.

"We're working with a number of large corporations to develop custom telecommunications solutions," said Division President Jonathan Crane. "[These] will assist their telecommuters and home workers with...capabilities that were once available only at corporate offices." Among the new applications are voice mail, E-mail, fax and teleconferencing.

According to Crane, the greatest benefits of telecommuting include improved employee productivity and morale and reductions in office-space and parking needs.

ILLUSTRATION BY MARY ANNE LLOYD

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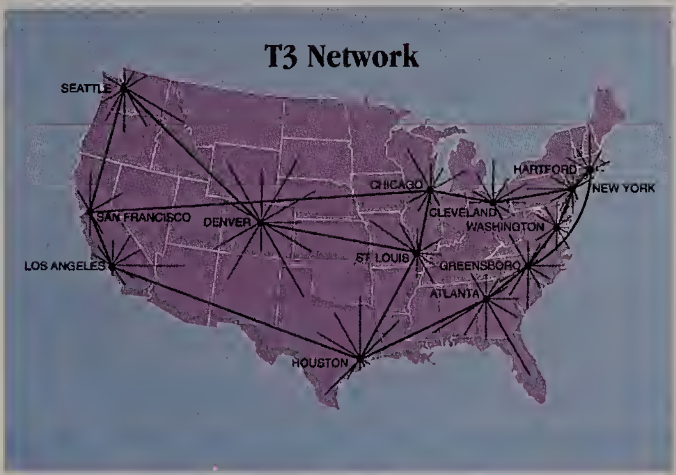

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Future Imperfect

Nobody can know the future, but IS executives must have some pretty good ideas about it. With thousands of people clamoring to sell you their vision of things to come, whom do you trust?

BY MICHAEL MARIEN

To stay competitive—perhaps even to stay in business—an organization must seriously concern itself with how things are changing, how they may change, what a preferable future might be and how to attain it. "The role of the CIO is to be constantly concerned with how things will be changing," stated John Diebold, chairman of the Diebold Group, in the January 1991 issue of *CIO*. If the CIO isn't the point-person for futures-relevant information, someone else will undoubtedly step in to provide leadership in this area.

Wouldn't it be nice to have a crystal ball to tell you what threats and opportunities lie ahead? Wouldn't it be wonderful to have a guru lay out the golden path to stability, prosperity and happiness? But looking for this kind of quick fix is exactly what you should *not* do.

There are thousands of individuals and organizations out there eager to give (or sell) their version of the future. The intent of these futurists is not to make firm predictions but rather to get a handle on emerging reality. They forecast the probable, sketch scenarios of what is possible, and point to desirable futures and the strategies necessary to get there. The challenge for time-strapped, risk-averse managers lies in separating the wheat from the speculative chaff where possible.

The first rule for sober thinking about the future is to recognize that in our overcredentialed world, it takes no credentials to be a futurist. A futurist is someone who claims to be a futurist, or is perceived as such. Some "overt futurists" are very good at thinking about probable and possible futures; some are not. Some "covert futurists," who call themselves policy analysts, systems analysts, forecasters, consultants, social scientists or environmentalists, also excel at supplying insights into these turbulent times. But many don't.

So who's really good? Credentials sometimes help to sort things out. A full professor at a prestigious university or someone with a Ph.D. often has important, leading-edge ideas. But not necessarily. And don't dismiss futurists outside of universities: With the freedom to think more broadly than academics, they may well possess the insights most applicable to your organization.

Footnotes can also be an important indicator. A book, report or article backed up with references to many other books, reports and articles suggests that the author is on top of the subject. But even copious footnoting may cite only the trivial

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while the author overlooks essential sources. Or the subject may be such that few references are available.

Special care should be taken in evaluating the thousands of reports churned out each year by think tanks and societies of all ideological stripes. Of course, just because a forecast dovetails with the author's bias does not mean it isn't useful. A partisan source merely warns readers to account for that bias in assessing the argument.

Unlike baseball players, futurists don't have easily measurable batting averages. But like baseball players, they don't get hits most of the time, especially if they play with big-league questions. Few could have anticipated the Persian Gulf War, AIDS or the sudden collapse of European communism. Uncertainties in areas like politics and the economy, and wild cards such as natural disasters and technological breakthroughs, make it impossible to forecast all things.

To complicate matters, it may be a decade or so before the accuracy of any forecast can be clearly assessed. Nonetheless, there are people out there whose reputations are built on intelligent thinking about the future, and over time readers will develop a sense of whom they can trust.

Documents can have track records too, and it may be worthwhile to familiarize yourself with regularly issued reports considered authoritative in their field. *World Resources*, for example, a report published every other year by the World Resources Institute in collaboration with the United Nations Environmental and Development Programs, is an impressive global overview of trends in population, resources and the environment. What it lacks in pizzazz it makes up for in credibility. Documents such as this can be used to benchmark other studies.

Gut feel, while more elusive than credentials and a track record, can also be valid. Simply ask yourself, does this sound right? Faith Popcorn lacks academic or scientific credentials, yet her forecasting of trends often seems to articulate what people have long felt but never put into words. Popcorn describes her methodology as reading books, magazines and newspapers and watching television and movies to try to figure out where we are as a culture. This is a sensible approach.

Smart businesspeople will accumulate as much material from as many sources as possible in order to make intelligent decisions on expanding into new markets, investing in technology or even hiring new workers. IS executives should seriously scan the organization's environment for a variety of views, in a variety of media, on a variety of potentially relevant issues. Of course some views will be better or more important than others. Of course there will always be constraints on time and cost, and CEOs hoping for the simple answer on the single page. Resist the pressure to simplify.

While most consultants deal with the future in some way, some specialize in it.

You should also avoid getting trapped in a single medium, looking only at newspapers or magazines, journals or books, print or electronic sources. And don't confine your scanning to immediate issues or obvious driving forces. The scope of futures-relevant information must always be large and diverse, with room for constant reassessment. A flexible world demands a flexible organization with a flexible information-gathering process.

Achieving a balanced perspective is another reason to gather as much material as possible. Many books and some trade publications have a tendency to indulge in boosterism aimed, for example, at an audience already predisposed to believe in the wonderful, just-over-the-horizon benefits of some hot new technology.

Diverse information input is essential in the long run but creates confusion in the short run. The solution is to develop a variety of scenarios through which to organize your futures thinking. Scenarios should range from the optimistic to the pessimistic, from the probable to the merely possible and from the desirable to the undesirable. Expert futurists point to the "profound simplicity" of keeping just a handful of plausible futures in mind. One futurist, for example, considers only four scenarios: the best and worst probable cases, and the best and worst possible cases.

Scenarios can help executives organize their thinking; but some may still need help digesting and interpreting this much material. One alternative is hiring a consultant. While most consultants deal with the future in some way, some specialize in it. Firms that offer this type of expertise can usually provide a broader, better-informed view than their more present-focused counterparts.

Some futurist consultants are generalists while others may specialize in a particular industry, like technology or health. These firms will put things in a large framework so as to highlight the trends that are affecting a company or industry, and prepare alternative scenarios to facilitate long-term decision-making.

It is important to remember that good futurists do not confine themselves to forecasts and speculations, but are also concerned with raising provocative questions that may significantly shape a company's vision. Indeed, this educational role may be the most important of the futurist's functions.

Our world is changing, rapidly and dramatically. The future belongs to those who undertake the difficult task of understanding the wide variety of intelligent thinking about these many changes. CIO

Michael Marien is founding editor of Future Survey, *a monthly abstract journal of futures-relevant books, reports and articles published since 1979 by the World Future Society, based in Bethesda, Md. For subscription information call 301 656-8274.*

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All in I.T. Together

An IS executive describes how his company is straightening out the kinks in the supply chain by reaching beyond EDI toward intercorporate information-sharing

BY GERALD LONG

The practice of negotiating business transactions strictly on price has created an adversarial relationship between vendors and suppliers. But the requirements of total quality management and the demand for shorter cycle times mandate closer cooperation among all links in the supply chain. Sharing information—quickly and consistently—has become critical to the success of anyone trying to deliver goods or services to a customer. The time is ripe for intercorporate information integration.

In most organizations, IS has evolved to the point where it is an integral part of normal business operations. Planning and implementing IT solutions to problems within specific business functions is information executives' key role. To date, most of us have concentrated on the manufacturing, inventory-control, engineering and order-processing functions. In some cases we have branched out into areas such as marketing and sales. But historically, we have not spent a lot of time directly in front of the external customer.

However, I see this focus changing over the next few years. More of us will spend more time working closely with our sales and marketing organizations and very closely with our IS counterparts in customers' organizations. Then we will expand the information relationship even further, to the point where we are working with our IS counterparts in our *customers'* customers' organizations.

At Roadway Express, the largest subsidiary of trucking company Roadway Services, this is already happening. We call the process "electronic data integration" and view it as an advance in the evolution of traditional EDI and business partnerships.

True integration requires that companies get together and explore opportunities to exchange critical information electronically. This process goes beyond the mere automation of business transactions with such tools as electronic invoicing, because it must take into account marketing and planning data, which do not lend themselves to standard transaction sets. The objective of electronic data integration is to improve customer satisfaction at every point in the logistics channel—from the delivery of raw material to the sale of the final product. It requires that all participants better understand the roles and value contributed by all other participants. But more importantly, it requires the integration of business information among companies (see "Getting the Message," *CIO*, June 15, 1992).

Any company interested in implementing electronic data integration must begin with an in-depth review of its mission-critical and support systems. As we at Roadway evaluated most of our in-

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But the trick is for everything to work together, with each part doing what it does best. And yes, it *really*

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ternal control systems, we determined that they were put in place primarily to act as checks and balances to compensate for the slow movement of information. As we accelerated the pace of information movement, we found that a number of the older controls were no longer required, or else had to be modified. (For example, we had been using a batch-balancing system for controlling time cards in productivity and payroll applications. Automated timekeeping systems completely changed the requirements for these systems.) Many controls were still necessary, but not in their existing form.

We also needed to rethink or modify systems within the context of our intercompany transactions. For example, when we looked at the interfaces between our invoicing and accounts-receivable functions and our customers' accounts-payable functions we discovered a number of opportunities for improving accuracy and reducing administrative costs.

Once we had reviewed our systems and modified them where necessary, we turned our attention to the entire logistics chain. If our customer were a manufacturer, for example, and that manufacturer's end customer were a retailer, our challenge would be to better serve both by facilitating their joint business dealings. We could achieve this by moving valuable information as effectively and efficiently as we moved their freight. The desired result would be a shorter cycle time required to make goods available to customers in the stores.

Electronic data integration can also streamline the flow of material between manufacturers. If Roadway could link into a manufacturing customer's production schedule and recognize when material is needed, we could build new systems capabilities and let both the manufacturer and its manufacturing customers know when material is moving, when it will arrive and when problems crop up. We expanded this approach to include applications like purchase-order verification, which ensures that the proper materials are moving with the proper authorizations before they arrive at our customers'—or their customers'—distribution centers or inventory sites.

The task of exploring these opportunities fell to joint quality teams. (As part of our internal total quality management efforts, we trained every employee in techniques to improve customer-supplier relationships.) Initially these teams were limited to systems staff and traffic-department personnel who service our company and our regular customers. But we soon found that in order to effectively implement necessary changes, we needed the participation of all the business areas involved. A transaction might involve the accounting department, for example, or accounts payable or receivable. And sometimes transactions need to be reengineered rather than automated. For example, customers might be able to prepare and pay their own invoices if we could determine in advance what critical information would be required by both companies and provide it electronically.

True integration requires that companies get together and explore opportunities to exchange critical information electronically.

It's amazing how productive a meeting with your counterparts from a customer's organization can be. Begin with a simple sharing of information: Explain to them how you handle their data and ask them how they handle yours. It is a good idea to ask them to bring in their auditors and accountants, or members of their sales and marketing or engineering staffs. Ask everyone at the meeting how your two companies can help each other do a better job. It's a novel approach, but when we've used it with our customers, we've been able to jointly enhance business processes.

In order to get customers thinking creatively about ways to exploit electronic data integration, we discuss how we might be able to help them improve inventory turnover, schedule manufacturing operations more effectively, improve our merchandising cycle times or reduce pipeline inventory for which they must compensate.

In each case, we talk about the technology that will be used to help implement changes. We work together to see where we can merge our systems plans with their strategic business plans (while never losing sight of the fact that our IT plans must continue to support Roadway's business strategy). This kind of interchange provides valuable insight into where our customers' business is going and, consequently, where we may want to direct our own development and planning.

All this may sound like a complicated, labor-intensive effort. But when you think about it, most of us are already solving very similar problems in customer satisfaction, inventory control, accounting, and organizational and operational management for our own organizations.

IS is often one of the last areas considered when a total quality management program is being implemented, but it should be one of the first. When managed strategically, IS can enable all other business functions to better support their external customers as well as their own company. Through a combination of intercompany cooperation and technological modification, electronic data integration forces information to work harder for everyone. CIO

Gerald Long is vice president of the IS unit at Roadway Express, the largest subsidiary of trucking company Roadway Services, in Akron, Ohio.

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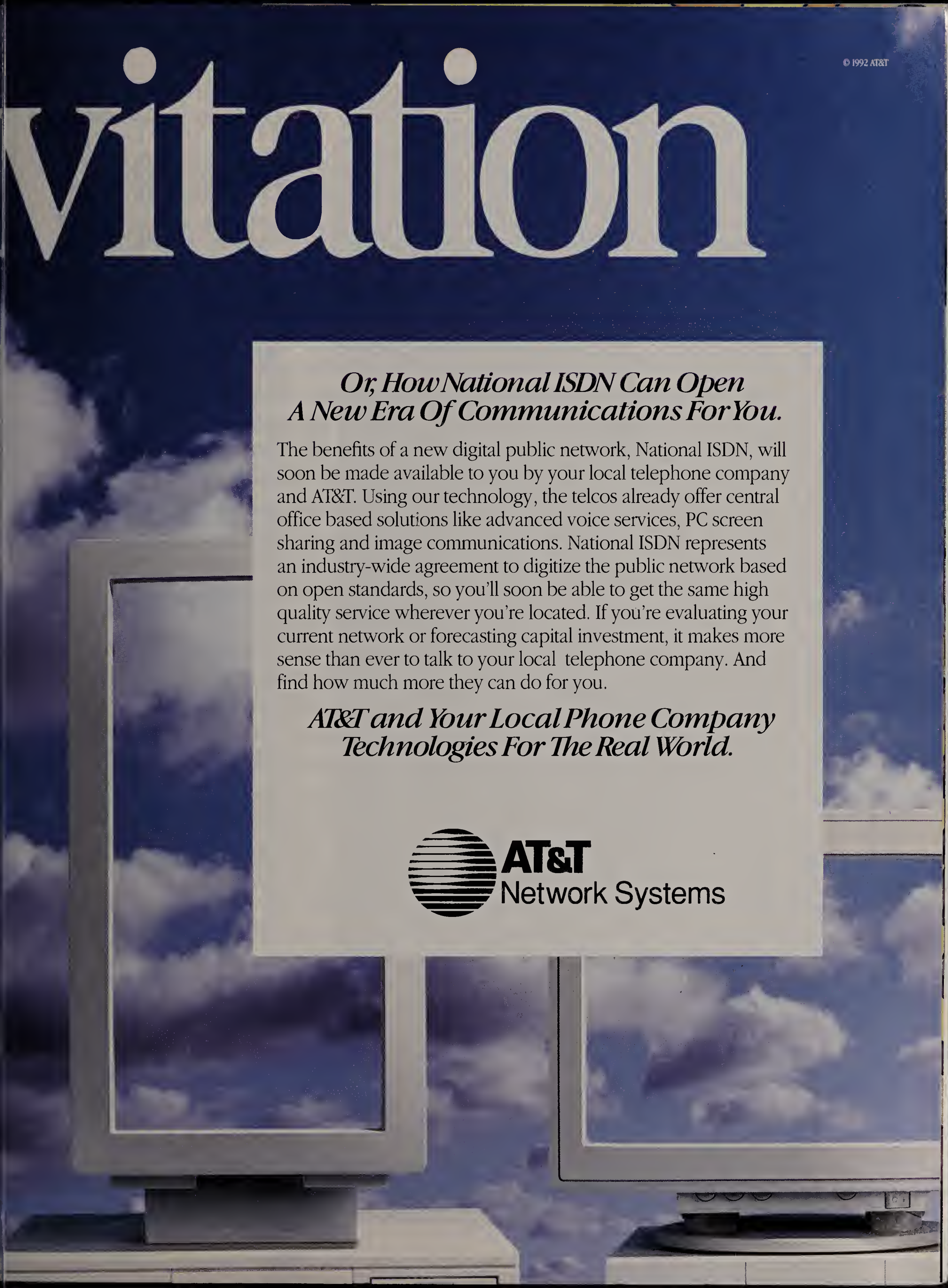

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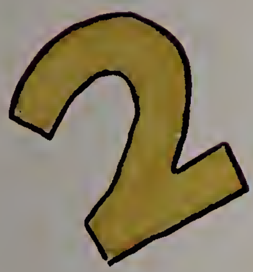
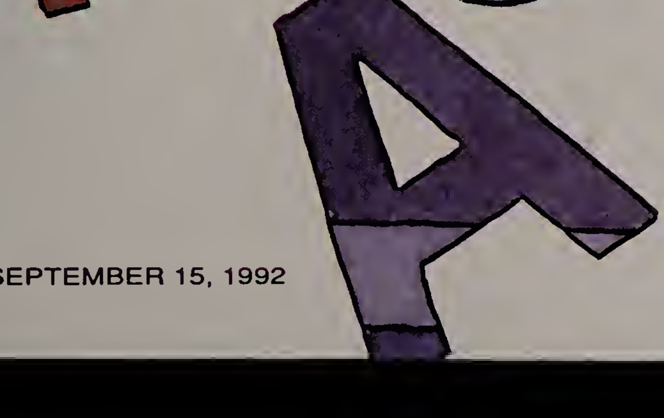
END-USER TRAINING

KNOWLEDGE EXPERTS

Putting a first-rate system in the hands of inadequately trained users is like giving an 18-wheeler to someone whose experience is limited to driving a Jeep Cherokee—the potential is there, but without some serious education it is unlikely to be fulfilled. Companies that invest a fortune in development and then stint on end-user training will find their expensive new systems underutilized, underexploited and sometimes misunderstood. Recognizing the importance of education, many companies are expanding their training programs in the classroom and beyond, and the benefits are showing up in smoother rollouts, improved productivity—and in some cases, better systems.





No Train, No Gain

Even the best, most elegant systems will fail if users aren't taught how to use them properly. Recognizing this, some companies have shaken off their lethargy and come up with aggressive, even innovative, training programs to ensure that systems deliver the intended productivity benefits.

PAGE 36

The Classless Society

While some 80 percent of U.S. companies still rely on traditional classroom methods for educating end users, options like computer-based training, videoconferencing, vendor outsourcing and regional coalitions are adding spice, flexibility and effectiveness to the process.

PAGE 42

Achieving Its Personnel Best

Chase Manhattan is unusually zealous—even for a bank—when it comes to technical training. "The information and the technology don't do anything on their own; it takes smart, educated people to exploit them," says CIO Craig Goldman. "Any CIOs who don't think training is critical need to go through an education program themselves."

PAGE 48

END-USER TRAINING

NO TRAIN, NO GAIN

Your average technology implementation's woebegone stepchild has traditionally been training. But organizations are finally wising up to the costs of neglect.

BY MEGHAN O'LEARY

End-user training, neglected in the past by CIOs and treated by almost everyone as an implementation afterthought, is in fact a fresh opportunity to win users' hearts and minds, while also saving organizations considerable time and money. Beyond that, however, training can also play an important role in designing better systems and achieving in systems-development efforts the kinds of benefits manufacturing companies have realized through concurrent engineering (see related story, Page 39).

Recognizing this, some companies have shaken off their lethargy and come up with aggressive, even innovative, training programs to ensure that systems deliver the intended productivity benefits—especially since even the best, most elegant systems will fail if users aren't taught how to use them properly.

Training needs range from the commonplace to the complex. All can be met using a carefully blended mix of in-house and third-party training options. Generally speaking, the more important and strategic an application, the more likely it is to be addressed internally, and with the close involvement of the IS group. But for short-term training needs, or for teaching large numbers of people to use a company-standard spreadsheet, many companies turn to third-party trainers—either software vendors or training companies.

For such assignments, third-party training offers both consistency and economies of scale, and also leaves in-house train-

ILLUSTRATIONS BY JAMES KACZMAN

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THIRD-PARTY TRAINING PROVIDES AN EXPEDIENT way to handle fluctuating demand for diverse technologies without obliging the user company to maintain a full-time staff of trainers versed in all of them.

ers free to work on the knottier training problems. For example, when Cellular One, a cellular phone service provider based in Columbus, Ohio, realized that it lacked adequate resources to meet all of its training needs internally, it contracted with Inacomp, a regional third-party trainer to teach employees in its Ohio and Michigan offices to use basic software. Through this arrangement, according to Cellular One senior trainer Mary Beth Burke, the company has been able to raise the software skills of employees to a consistent level while freeing the human resources department to concentrate on training employees to use essential customer-service and administrative systems.

Third-party training also provides an expedient way to handle fluctuating demand for diverse technologies without obliging the user company to maintain a full-time staff of trainers versed in all of them. For instance, computer maker Amdahl Corp., of Sunnyvale, Calif., which is heavily involved in business reengineering and frequently experiments with advanced technologies, likes the third-party option because it's relatively easy to arrange training sessions and requires only a short-term financial commitment. While Amdahl does do some in-house training, it relies on outside trainers to keep up with its constantly changing technical needs.

Judging from the rapid growth of some third-party trainers, the economics must be appealing to users. ExecuTrain, a third-party trainer based in Atlanta, reported a truly phenomenal 100 percent increase in sales from 1990 to 1991, primarily from existing clients who were cutting back on their internal training staffs. (Another factor contributing to the growth in third-party training might be a decline among software and systems vendors of the practice of providing training with installation services at no extra charge, a practice that is going the way of free upgrades.)

BECAUSE IN-HOUSE TRAINERS know their companies well, they can provide instruction that incorporates helpful context regarding operating procedures, standards and access to information across the organization.

For proprietary or mission-critical systems, companies often elect internal training. Because in-house trainers know their companies well, they can provide instruction that incorporates helpful context regarding operating procedures, standards and access to information across the organization.

At many companies, internal training is still handled by a non-IS group, often hu-

Extending Your Teach

These seven strategies for trainers, students and their managers help enhance training effectiveness within NCR Corp., but they can work for any company looking for better training ROI.

1. **Before sending students to training, managers identify ways the new technology will be applied in support of the business.**
2. **Managers provide employees with opportunities to use the technology prior to training.**
3. **Trainers use meaningful examples, including actual company data or reports, as practice exercises.**
4. **After training, managers monitor employee success in applying newly learned skills and provide hand-holding when necessary.**
5. **After completing the course, students are allowed practice time to get used to the system and develop their own techniques.**
6. **For everyone involved, patience is a virtue.**
7. **Managers should keep finding new tasks to challenge employees and keep their skills up-to-date.**

man resources, or by the user department itself. IBM Corp. has its own training division called Skill Dynamics, based in Atlanta, which trains IBM employees and customers alike. And Caterpillar Inc., of Peoria, Ill., trains corporate users through the Caterpillar Institute. Both of these training groups handle general job training as well as computer training. For technology-related instruction, the IS department acts as a subject-matter expert in curriculum development and as an occasional troubleshooter in working the kinks out of a new system.

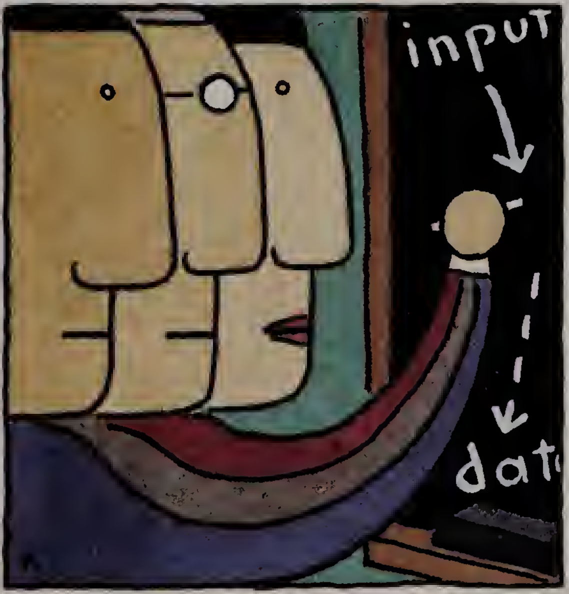
According to Sam Jannetta, vice president of marketing, service and customer education for Skill Dynamics, IS's exper-

IN AN INCREASing number of companies, budget pressures have forced training directors to mandate that training focus strictly on skills the user needs to do the job, rather than on the myriad capabilities of a given package or system.

Shadowing IS

When trainers and users play a concurrent role with IS in system development, better training and better systems will likely result

Closely integrating training with the system-development effort may be the most promising new approach in the training arena. Several companies employ what is sometimes called "shadow development"—creating the training and the system concurrently. In-house trainers and users collaborate with IS in evaluating prototype systems and developing training for them as they are built. Getting practical input on the system's functionality and ease-of-use helps the IS group improve it while it's still under development. And trainers can anticipate problem areas and make sure their materials address these adequately.



At Avon Products, the beauty-products firm based in New York, users participate in this kind of advance testing. According to Avon CIO Raymond Perry, by the time a system is rolled out, preliminary training has already taken place, so the process tends to go very smoothly.

Shadow-development users report lower overall development costs (because the need to modify systems and training is reduced), shorter learning curves in user departments and greater immediate productivity. These benefits helped Banc One Services Corp., of Columbus, Ohio, carry out a major system transition on the fly. According to Vice President of Client Services Jack T. Compton, Banc One needed to roll out an automation system to 1,350 branches without interrupting service to customers. The rollout was part of a reengineering effort designed to improve systemwide levels of service though enhanced access to higher-quality customer information at each branch. Compton worked with training managers to develop tools that would allow branch workers to call up reference and training information from their workstations as needed. So they were effectively training themselves as they used the new systems.

Finally, shadow development encourages users to accept and promote the system. Involved users are much more likely to trust the system and use it well. And productive use of a strategic system can save a company money and help it achieve its competitive goals.

"We didn't bring users in because we wanted them involved in training, but in the project," Avon's Perry said. "Training [at Avon] is no longer an issue. That's testament to the success of this approach."

–M. O'Leary

tise doesn't—and shouldn't—necessarily include teaching skills. "One of our core strengths is our ability to translate requirements into education products and measure them," said Jannetta. "IS's strength is IS."

But other training departments style themselves more as partners with the IS group. At Pizza Hut Inc., in Wichita, Kan., the training group stays in touch with IS throughout the systems-development process so that it can more effectively plan training resources. The group also helps IS design effective help screens and write clear documentation.

Although such IS-training partnerships suggest that training is a growing IS priority, the financial commitment to training still comes more often from user departments than from IS's systems-development budgets. Which might help explain why IS has traditionally looked askance at training. IS is "very willing to help us out" with training, said Cellular One's Burke. "But they're more under the gun to get a lot of [systems] in place."

MANY COMPANIES HAVE OPTED FOR PEER-TRAINING approaches whereby small groups of very well trained users go forth to train their fellow users. The cost advantage of train-the-trainer programs is that instead of paying trainers and users to sit in a classroom all day, a department has only to pay its own users; and in many cases the training can occur on the premises.

There are other financial considerations that affect both the scope of training and IS's attitude toward it. In an increasing number of companies, budget pressures have forced training directors to mandate that training focus strictly on skills the user needs to do the job, rather than on the myriad capabilities of a given package or system.

"Eighty percent of our users probably only use about 20 percent of the package," said Orville J. Raitt, training supervisor at Caterpillar. Caterpillar's training group offers different training modules to teach users specific skill sets geared toward their jobs. Although Raitt likens this approach to teaching someone how to play "Chopsticks" on a concert grand, it saves Caterpillar a lot of training time and gets employees using a package effectively in short order. Pizza Hut has also tried job-matched training and has almost completely eliminated training-related help-desk calls, says Richard Smola, manager of development and training.

Likewise, Coopers & Lybrand, the New York-based Big Six accounting firm, carefully regulates the amount of computer training employees receive. Users who request software training are interviewed to determine whether the training is really necessary to their jobs.

As a support function, training groups often come under pressure to help reduce company costs overall. To that end, many have opted for peer-training approaches whereby small groups of very well trained users go forth to train their fellow users. Besides adding the requisite job-specific context, peer trainers can also give personalized attention and function as role models. The cost advantage of train-the-trainer programs—as SmithKline Beecham Plc. of Philadelphia, Cellular One and New York-based Avon Products have all found—is that instead of paying trainers and users to sit in a classroom all day, a department has only to pay its own users; and in many cases the training can occur on the premises.

Cellular One's job training coordinators (JTC) teach fellow employees both how to perform their jobs and how to use the company's customer-service system. In addition to the cost benefits of peer training, Cellular One has found that the JTC role is a good way to recognize selected employees' proficiency and professionalism. This in turn helps Cellular One's training department cultivate a willing and able trainer pool.

Despite the traditional division between IS and training, some IS departments get directly involved in training users, primarily because they see a chance to advance both technology and the company's business goals through education. "We rely on [our computer systems] to improve customer service, to quicken our drug cycle, improve our manufacturing process and improve our margins," said Justin Alexander, SmithKline Beecham's consultant of advanced technology. "Those are the holy grails here." Alexander is investigating computer-based tools that will enable SmithKline's training department to bring training to the desktop and allow users to learn at their own pace and be more productive.

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END-USER TRAINING

THE CLASSLESS SOCIETY

Frustrated by the tedium and expense of traditional classroom training, some companies are looking for newer, sexier ways to educate end users

BY RICHARD PASTORE

The most exciting thing about sitting in a classroom all day are the chocolate-chip cookies they provide for you to snack on during breaks. And even those are often disappointing. Realizing this, companies have explored a number of classroom alternatives for end-user technical training that add spice, flexibility and effectiveness to the process. While some 80 percent of companies in the United States still rely on traditional classroom methods, options like computer-based training, videoconferencing, vendor outsourcing and regional coalitions are showing up more frequently as technology costs dip and personnel costs rise.

COMPUTER-BASED TRAINING (CBT), with its multimedia foundation, is one of the sexier alternatives to classroom instruction. Students park themselves at dedicated workstations loaded with packaged or custom-built courseware resident on floppy disks, compact read-only disks or both. At their own pace, they electronically page through multimedia presentations that instruct, quiz and evaluate learning. This approach is well-suited to trainees whose work schedules or responsibilities make classroom attendance impractical.

CBT's up-front costs can be high. In addition to a personal computer, figure on shelling out $4,000 to $8,000 per learning station for hardware. Courseware costs per student diminish as the number of students rises. Allen Communications Inc. in Salt Lake City charged one customer $250,000, or $33 per head, for a course to train 7,500 students. For smaller groups, say 700, the price might rise to $250 to $400 per head. But the benefits of self-paced, user-site instruction can outweigh the high startup costs, according to CBT aficionados. They have found that CBT shortens the learning cycle, boosts retention rates and avoids the expenses of travel, ongoing instructor fees and the productivity costs incurred when workers leave their jobs to attend class.

For the past five years, Bethlehem Steel, based in Bethlehem, Pa., has used multimedia CBT for both end-user technology training and steelworker instruction. A key motivator for adopting CBT was schedule flexibility. No longer must steel production lines be shut down for a week at a time so workers can attend class. Now on-site training is available any time a worker can squeeze it in. "Meanwhile, production is still going on, so the foremen love it," said

RICHARD SMOLA: BECAUSE TRAINEES USING CBT CAN PACE THEMSELVES, THEY AVOID THE INFORMATION OVERLOAD COMMON TO CLASSROOM CRASH COURSES.

PHOTO BY LARRY FLEMING

Leon Murphy, former manager of the multimedia applications team within the steelmaker's IS group. The flexibility makes optional training much more popular; one group of workers increased its training consumption 500 percent over three years. More than 15,000 employees in all have taken at least one of Murphy's 1,000 videodisk or 100 interactive-video courses developed with Intel Corp.'s DVI multimedia hardware and IBM's M-Motion video board.

Because students can skip lessons they already know, total instruction time with CBT is often shorter for a given course than it would have been in a classroom setting. At Bethlehem Steel that reduction has been as much as 40 percent. But even if no time is saved, CBT's self-pacing improves retention by avoiding the information overload common to classroom crash courses. "Before, we were taking 15 hours of training and trying to cram that into a 10-hour day," said Richard Smola, manager of development and training at Pizza Hut Inc. in Wichita, Kan. "That's a long time to be sitting in a classroom, and we found they couldn't absorb it." Now the company's restaurant managers have a two- to three-week window in which to absorb the material via restaurant-site CBT.

In some circumstances, CBT can be the cheapest way to go. Companies like Banc One Services Corp. in Columbus, Ohio, are finding CBT to be a consistent, easily reproducible means of training a large user base on-site, with the added attraction of easy customization and upgradeability. Jack Compton, Banc One's vice president of client services, chose to develop LAN-based CBT for each branch after he realized an army of outside instructors would offer him no economies of scale and would lack the company-specific context his 25,000 users needed at the core of their branch-automation training.

FARMING OUT PLAIN VANILLA technical training frees internal resources to focus on business-specific or mission-critical systems training.

JUST-IN-TIME TRAINING, a recent offshoot of CBT and perhaps the hottest thing under the technical-training sun, is CBT courseware that permanently resides at the user's worksite. It transplants training from the remoteness of a learning center to the immediacy of the user's desktop. The purpose is two-fold. First, it helps eliminate the memory lapse that often occurs when knowledge acquired during a training session is not immediately exercised on the job. Second, it makes "refresher training" available instantly whenever the user desires it.

At its most advanced, JITT is available embedded in existing applications or as a parallel, online system—such as Banc One's online branch-automation reference system, which users access from the application itself whenever they have a question.

JC Penney Co., the Dallas-based retailer, offers its customer-service representatives a training database running alongside its order-entry application. The training module allows Penney reps to simulate the order-entry process or refresh their memories about proper phone techniques. The reps can also "look up" how to deal with out-of-stock items or credit-card denials.

THERE'S A PERCEPTION THAT TECHNOLOGY VENDORS spend too much class time chatting up their product's good points and avoiding its faults.

VIDEOCONFERENCING is perhaps the only training alternative sexier than multimedia CBT (and more costly—for example, Andersen Consulting charged a client $11,000 to telecast a live, 30-minute training program to its dealers). But for geographically dispersed companies with time-sensitive businesses, video's widespread, simultaneous broadcast ability makes it the best choice.

"There's nothing more effective than an unfiltered visual message," said Dennis Healey, vice president of MIS at Toys 'R' Us Inc. in Paramus, N.J. But it would be competitively and economically disastrous to pull employees out of hundreds of dispersed stores to prepare them for the Christmas rush, for instance. Instead, a video system allows corporate instructors and managers to deliver simultaneous, up-to-the-minute instruction and coaching. Store employees can pose questions in real time over the two-way audio link. The toy retailer expects a full videoconferencing rollout to more than 500 North American stores next year.

PHOTO BY JOHN RAE

DENNIS HEALEY: "THERE'S NOTHING MORE EFFECTIVE THAN AN UNFILTERED VISUAL MESSAGE."

THIRD-PARTY VENDORS represent the most common alternative to in-house classroom instruction, particularly for training masses of end users in common software packages. As a testament to instruction outsourcing's growing popularity, third-party trainer ExecuTrain of Atlanta saw its sales increase nearly 100 percent in 1991, according to President David Deutsch.

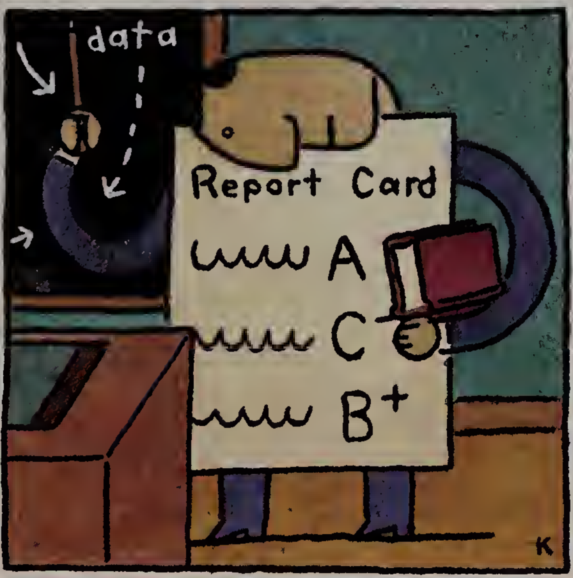
Farming out plain vanilla technical training frees internal resources to focus on business-specific or mission-critical systems training. Mainframe-maker Amdahl Corp. in Sunnyvale, Calif., relies heavily on third-party end-user training, allowing its internal trainers time to focus on its number-one training priority: teaching end users about business-process reengineering and its potential to make the business more profitable and effective.

Internal trainers also turn to outsiders when they can't keep up with the growing suite of software products their users are adopting. "The number of applications we could cover was limited even among those that were company standards," said Joseph Limanowski, manager of education services and technology at Cincinnati-based commodity plastics producer Quantum Chemical Corp. Quantum chose national PC retailer Inacom of Omaha, Neb., to provide its end-user training.

COMPUTER VENDOR-SPONSORED TRAINING gets the most mixed reviews of any alternative. There's a perception that technology ven-

Keeping Track of Training

Follow-up measurement is essential if managers are to ensure that lessons stick and stay stuck



Driving 55 is something we all know we should do—it's safer and improves gas mileage. But who the heck has patience for 55? The same can be said of measurement, a plodding practice that IS managers neglect even as they extol its virtues. Happily, while measurement is a must to ensure end-user training effectiveness, it doesn't have to be all that tedious.

"Follow-up measurement is often perceived as a huge task, but it doesn't need to be that complex," argued Naomi Karten, president of Karten Associates, a management consulting firm in Randolph, Mass. "A few random phone calls to participants 60 to 90 days after the class will invariably yield useful information." To lighten the follow-up burden, IS can enlist end-user managers to monitor post-training skills levels and then simply poll the managers.

Fortunately for harried trainers, the longer follow-up is postponed, the more accurate the assessment. Students need time to apply training on the job and build competency. Consequently, end-of-class evaluation forms, though common, are of little value. Students invariably scribble positive but insincere comments on these "smile sheets" as they bolt for the door. "They're so tired they'll write down anything just to get out of there," said Dave Nowak, project manager at Hallmark Cards Inc. in Kansas City, Mo. Hallmark surveys students a full six months after graduation.

Too strapped to toil over follow-up questionnaires or telephone polling? Then try the help-desk acid test. Texas Instruments Inc. in Austin, Texas, had problems with its semiconductor distributors misusing a customer quote system. After rolling out a custom computer-based training course designed by Dallas-based BehaviorTech, new-distributor support calls to TI fell from a typical 10 in the first week to zero. Quoting errors also fell to zero from the first week average of 21.

It's even possible to automate measurement. CBT users can build competency tests into the courseware itself. Students who take follow-up tests can compare results with their initial scores to gauge retention rate.

Clearly it's possible to spot signs of training effectiveness without slowing down to 55.

—R. Pastore

ILLUSTRATION BY JAMES KACZMAN

dors spend too much class time chatting up their product's good points and avoiding its faults. "An independent is less biased toward the product," said David Stanfield, manager of the workstation technology group at pharmaceutical firm Glaxo Inc. in Research Triangle Park, N.C.

But as training becomes a bigger source of revenue for computer vendors, they are working harder to build their credibility. "We go through the product in its entirety," warts and all, said Gary Quinn, vice president of research and development at Computer Associates International Inc. in Islandia, N.Y. CA instructors work with customers to pinpoint product limitations and explain ways to work around them, according to Quinn, who designed the course material CA provided to 26,000 end-user customers last year.

JOSEPH LIMANOWSKI WENT OUTSIDE FOR TRAINING IN ORDER TO COVER THE GROWING SUITE OF SOFTWARE PRODUCTS USERS WERE ADOPTING.

PHOTO BY TOM ROGOWSKI

THE LOCAL TRAINING COALITION is another, relatively new, budget-driven alternative. Several companies in a region band together and pool their instructional resources and buying power. Some contract with third-party service groups to handle the training discount negotiations and administrative details. One such service group, Altra Inc., based in Rockaway, N.J., leverages the formidable volume-buying power of clients like PaineWebber Inc. and American Cyanamid Co. to extract 15 percent minimum tuition discounts from third-party trainers. Altra clients pay $1,000 a year to receive this and other services. Similarly, Omicron, an IS society based in Mountain Lakes, N.J., charges members a 5 percent administrative fee per student booking. Omicron's coalition, which previously focused exclusively on IS staff training, recently expanded into end-user technology training at the request of its members, said Omicron President James Webber. Omicron arranged a 40 percent tuition discount on all end-user courses from Productivity Point International/MicroTrek in New York.

SEVERAL COMPANIES IN A GIVEN region band together and pool their instructional resources and buying power.

Coalition members take turns hosting classes that are open to students from other member companies. Hosts typically receive bigger discounts, sometimes twice as large, for that particular course. Occasionally companies running internally developed courses will invite fellow members to fill any empty seats. This type of student swapping can take place without a formal coalition, at least on a limited basis.

"Training managers from several nearby companies get together every other month to discuss current training trends and what's available," said Cheri Vaughn, project manager of the information technology learning center at Glaxo. For efficiency's sake, Glaxo may send a few recently hired employees to a class being held at another company rather than schedule a special session for them.

None of these alternatives meet all of an organization's training requirements. Some fill narrow niches or complement other technical-training delivery vehicles. But for most firms, at least part of the time, these options sure beat a sore behind and stale cookies. CIO

The man with too many yo-yos.

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END-USER TRAINING

PROFILE

ACHIEVING ITS PERSONNEL BEST

Chase Manhattan is building a smart user base by breaking down walls between business and technology training

BY RICHARD PASTORE

The evidence can be seen on Flatbush Avenue in the heart of Brooklyn. On the second floor of the newly erected 1.8 million-square-foot facility, you'll count 19 classrooms wired for PCs, with links to a worldwide network; several conference rooms, and a 300-seat auditorium—in all, 39,000 square feet devoted to technical instruction. The proprietor of this $750,000 commitment to training is Chase Manhattan Corp., which will use it to instruct some 6,500 end-user and technical staff relocating here from Manhattan.

Why is Chase making such an investment in training when other companies are being pressed by budgetary concerns to curtail their efforts? Perhaps it's because the bank's top executives, who took over following steep losses in 1990, spring from the systems and operations pool. Or it could have to do with the company's competitive credo—effective application of technology is one of its main means of differentiating itself. Whatever the reasons, it's clear that Chase is unusually zealous—even for a bank—when it comes to technical training.

Like many banks, Chase took its financial lumps in recent years—$334 million worth in 1990. Unlike some, it did not cut its technical training budget, which this year has risen to 3 percent of the total IS budget (technical training costs are charged back to users). The increase was necessary in part to fund the formidable task of training the 6,500 relocating employees in the Brooklyn facility's new standard operating environment, Microsoft Corp.'s Windows, and the Microsoft Word for Windows package. By contrast, the Manhattan trainers instructed 4,000 employees last year.

While some CIOs deliberately keep their noses out of training issues, one would be hard-pressed to find at Chase a more enthusiastic advocate of aggressive training than CIO Craig Goldman. "The information and the technology don't do anything on their own; it takes smart, educated people to exploit them," Goldman maintained. "Any CIOs who don't think training is critical need to go through an education program themselves." This from a man who is *not* directly responsible for training.

That responsibility rests with Chase Vice President and Manager of Technology Training Patricia Coglianese, who reports to the head of human resources and has dotted-line connections with Goldman. This bifurcated structure may seem schizophrenic, but without it, Chase's training commit-

PATRICIA COGLIANESE AND CRAIG GOLDMAN: COORDINATING IS AND HR TRAINING EFFORTS

PHOTO BY JOHN RAE

SNAPSHOT

Once decentralized, Chase Manhattan Corp. now presents itself to customers as a single, unified institution. The company's aggressive training program reflects this seamless approach by coordinating technical and non-technical instruction, developing training with new systems and shaping course content to suit business needs.

ment might be just so much corporate hot air. Because Coglianese has a tent pitched in both the HR and IS camps, she can achieve a degree of training coordination and cooperation not found at many companies.

"When you do training in a vacuum, with walls between you and systems, you can only develop a partial product that nobody is happy with," said Coglianese, who cut her training teeth in the New York school system. "I don't have to break down walls, because I already belong in both worlds."

Coglianese uses insights drawn from the non-technical training programs run by HR to shape her technical instruction. This results in technical training that is more consistent with non-technical programs and provides trainees with a more unified learning experience. For example, Coglianese will confer with an HR manager of teller training in order to integrate teller-systems instruction with such non-technical areas as sales techniques.

Providing seamless, single-point-of-contact training for bank staff is a reflection of a new corporate direction. Once a decentralized institution, the bank has recently adopted a strategy to present itself as one entity to its external customers. "If we treat our internal customers in this seamless, consistent manner," this sense of unity is likely to trickle down to external customers as well, Coglianese said.

From her relationship with IS, Coglianese gleans firsthand information on the capabilities and limitations of new technology and applications. This gives her a head start in mustering her training resources and planning course material. In fact, as developers are building a pilot system, the trainers are often simultaneously devising the training for it. In a sense, the training gets piloted along with the system.

This cooperation starts paying dividends as soon as systems reach the end users. Because of the careful attention paid to

"WE CAN EVALUATE students coming out of the classroom, but the leap that's most difficult to make is to measure the effectiveness on the job."
–Patricia Coglianese

users and training during development, "when they roll out the system, it's functional, adds value and is comfortable to use from day one," said John Reid, senior vice president of financial institutions in the bank's North America sector.

Both Coglianese and Goldman admit that this kind of cooperation doesn't always gel. With system-development cycle times decreasing to as little as two weeks from a more-typical 18 months, IS doesn't always have time to clue in the trainers or seek their input. "But we still try to put out a road map of platforms and interfaces we are moving toward," Goldman said.

Chase is in the vanguard of companies approaching technical training from a more business-oriented slant. "The biggest mistake we could make is teaching what keys to hit without understanding how users will apply the technology to their jobs," Coglianese said. Accordingly, Chase classes are often customized to reflect the jobs of a specific group of learners. Even for something as generic as Lotus 1-2-3, classroom exercises could be tailored to demonstrate the product's use in an application such as mergers and acquisitions. This type of customization brings the subject matter much closer to home.

Coglianese suggests companies start by plucking out all the generic examples from a functional course and replacing them with real examples from the actual business, along with exercises tailored toward the trainees' own tasks. An outside consultant might help with the first attempt, teaching internal trainers to do it themselves.

In another twist on traditional course content, Chase recently launched a series of technology management classes that invite joint participation by IS and end users. These courses tackle such sticky IS-user issues as cooperative systems development, in which both parties learn how to plan and develop systems that better meet user requirements. The trainees study techniques to locate errors during the development cycle's analysis phase as well as its coding and testing phases. The goal is to familiarize users with the realities of IS. "Technology in the past has been made to look like a world of smoke and mirrors," said Goldman. "That's not the case anymore."

Though Chase is not under pressure to cut training expenses, Coglianese and Goldman are continually looking at more cost-effective alternatives for delivering instruction. Live classroom instruction predominates and will likely continue to do so. But Goldman is pushing efforts to study both high-tech alternatives, such as multimedia-based self-instruction, and low-tech alternatives, such as audio and video aids that students can take home with them. These options will most likely fill niche roles. Self-study approaches, for example, seem best suited for giving all trainees a level jumping-off point before they sit down together in a classroom. Videoconferencing, with its melding of live instruction, graphical tools and remote reach, will become increasingly important as Chase extends its training to overseas employees.

While Chase may be pointing the way in training alternatives and business-oriented instruction, it is just one of many companies befuddled by the difficulty of measuring training effectiveness (see related story, Page 45). "We can evaluate students coming out of the classroom, but the leap that's most difficult to make is to measure the effectiveness on the job," Coglianese said. Even follow-up calls and surveys may not pinpoint the effect training has had because so many other factors play a part. For instance, programmers who were trained to develop systems on personal computers experienced a 30 percent jump in productivity, while mainframe use dropped 50 percent. "We are credited with that, but how much of it is due to training we don't know."

Other companies in this same pickle are banding together to find a solution. Chase is one of about 28 firms participating in a benchmarking and metrics standardization study organized by the American Society for Training and Development in Alexandria, Va. Coglianese also meets periodically with training managers from other Manhattan firms to compare notes. The goal is to nail down the value that training contributes to their organizations.

Other technical trainers may envy Coglianese and Goldman their company's abundant resources and top-down commitment to training. But along with the high-tech courseware and fancy new facilities come greater expectations. Inevitably the pointed question will come: Where's the payoff? "That's when I'd better understand what my value is to the organization," Coglianese said. For most firms, that's the toughest lesson to learn.

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To MARKET,

Speed to market can mean shortening product development cycles, straightening out logistical corkscrews, or being first out with a new idea. And speed itself is relative. A manufacturer may be thrilled to cut a month from a product cycle while a purveyor of fresh foods has to count hours. But no matter how you measure speed to market, information technology makes it happen.

"The facts of life today are that product life cycles are shorter," said Laurence Chait, director and manager of strategic information technology planning at consultancy Arthur D. Little Inc., in Cambridge, Mass. "The nature of competition is changing, broadening, [becoming] more global. A sort of constant acceleration is being applied to the business environment. It all means you have to get products to market faster."

Whether in the perishable-foods industry, high-tech manufacturing or financial services, information technology is greasing the wheels of product development and delivery.

As product life cycles diminish, companies selling everything from integrated circuits to fresh pizzas must get their goods to consumers more quickly

BY KATHLEEN MELYMUKA

To MARKET...

STEPHEN CUNLIFFE: *"The fundamental difference between success and failure is logistics."*

PERISHABLE FOODS:
Nestle USA

Nowhere is the pressure more intense than in the perishable-foods market, where many corporations have discovered what a difference a day makes. "The fresh-products business is one that almost all major [food manufacturers] have tried," said David deRoulet, president of Cleveland Consulting Associates, a consulting firm specializing in operations management. "The landscape is littered with failures."

One of the few exceptions is the Nestle Refrigerated Food Co., maker of the Contadina fresh pasta and pizza line. "We need to speed a product to market because it's perishable and it's ticking away like a time bomb," said Stephen Cunliffe, president of the Glendale, Calif., Nestle USA subsidiary. Information technology is used throughout the business to buy the company more time.

Marketing staff use information technology to consolidate shipment and point-of-sale data. "That becomes the basis of our business planning," said Cunliffe. Because of the products' perishability and the need to be responsive to orders, production plans are constantly being reshuf-

PHOTO BY STEVEN BURR WILLIAMS

fied. That means rescheduling incoming raw materials, whose perishability makes automated inventory- and delivery-tracking essential.

The biggest hurdle of all is shelf life. "Initially these [kinds of] products had a shelf life of about two weeks," said Cleveland Consulting's deRoulet. But Nestle is using technology to extend that. In the production process, sophisticated computers control critical processing parameters that knock out bacteria. Computers also control the modified-atmosphere packaging that keeps oxygen from the product, preventing bacterial growth. The result of these processes is a shelf life of 40 days, which makes the rest of the cycle doable.

Even so, date sensitivity adds an extra dimension to inventory management, Cunliffe said. "We rely on information systems to know not just how much product we have in total in inventory, but how much by date code. The system flags us to get [the oldest product] out the door in a hurry."

Delivery problems have scuttled many an effort in the perishable-foods industry. "The fundamental difference [between success and failure] is logistics," Cunliffe said. Some of those manufacturers who have failed were forced by a two-week shelf life to bypass normal grocery distribution channels in favor of direct delivery from their factories to every store, he explained. "That brings with it very high cost."

Because Contadina's production process buys it precious time, it has been able to deliver to the customers' perishable warehouse facilities, cutting costs substantially. "That's made it feasible," Cunliffe said. Even so, "it takes some pretty slick logistics"—and those systems are IT-based.

When consumers buy the product, information technology completes the loop and it starts all over again. "At the end of the cycle, scanner information is generated, which is what the marketing people use to forecast," Cunliffe explained. "So you're back to the beginning of the cycle." ■

PHOTO BY DAN BRYANT

HIGH-TECH MANUFACTURING:
Texas Instruments

IT helps move products quickly from concept to customer, especially crucial in high-technology industries where today's marvel is tomorrow's antique. "We have a number of products that have a short cycle time to market," said Ralph Szygenda, vice president and manager of information systems and services at Texas Instruments Inc. in Plano, Texas. Semiconductor devices, application-specific integrated circuits, connectors, circuit breakers, calculators, software and learning toys all need extremely short cycle times to compete, he said. And in the government-contracts market, business goes to the supplier that can do it the most quickly and at lowest cost.

TI addresses the issue of speed at every level of its operations. "We start at the top with business-process engineering and reengineering," said Szygenda. "If you don't have the business process down, you will be writing [systems] for the wrong thing." Cycle time is a "major driver" of the company's reengineering efforts, he said. "We benchmark against the world's best; if we're deficient we redo the process."

Concurrent design and engineering play a large part in speeding product development, and TI's worldwide networking facilities bring new meaning to the concept of concurrency. "We can truly do concurrent engineering on a worldwide basis," said Dan Murphree, director of information technology for the systems and equipment sector. "The concept for a new calculator or for a

DAN MURPHREE AND RALPH SZYGENDA : *TI addresses the issue of speed at every level of its operations.*

new learning tool might require the design expertise of people in the United States, a [manufacturer] in Italy and third-party design or manufacturing in the Far East. Having a communications network that works seven days a week, 24 hours a day, enables us to do joint design in the three regions, dramatically decreasing the cycle."

But product design is only the beginning. IT also speeds manufacturing. In TI's HAARM (high-altitude anti-radar missile) factory, materials are automatically picked from a multilevel storage facility, moved by automated vehicles to the factory floor and manufactured on a largely automated assembly line. Since automation, products have been manufactured 10 times more quickly at 45 percent of the previous cost.

In its Paveway missile-guiding-system factory, a similar level of automation has improved productivity 61 percent and decreased the amount of material in process by 47 percent. "Extra material just adds cost and increases cycle time, because [it requires you] to manipulate materials without adding value," said Szygenda.

Another less obvious aspect of speed to market is the ability to facilitate financial planning. TI uses a common general-ledger system across all business entities worldwide. It uses one organizational structure, one set of accounts and one set of cost classifications so there are no interpretation problems with different currencies. "It allows us to very quickly consolidate our financial picture by business, region or total company, allowing us in real time to have a financial picture of operations on a worldwide basis," Murphree said.

Procurement delays can hinder speed to market, but at Texas Instruments, EDI has kept that to a minimum. "We've developed a number of capabilities such as support for global option agreements for material," Murphree explained. "Any requisition can take advantage of contracts for best source of material anywhere in the world."

Requisitions are routed electronically for approval and comparison against option agreements. If one agreement applies, the order is passed on to that supplier. Interactions such as negotiations over delivery schedules take place electronically as well, so the entire purchase can be settled in hours.

> EDI GIVES US COST AND CYCLE-TIME REDUCTION, ENABLES JUST-IN-TIME MANUFACTURING, ELIMINATES ORDER ENTRY AND REDUCES THE NUMBER OF PEOPLE THAT HANDLE ORDERS."
>
> *–Dan Murphree*

About 1,000 TI suppliers use EDI, and about 67 percent of orders are placed electronically. In those cases, three-quarters of the cycle time has been eliminated. (The company now markets this system—which it says saves it $30 million annually—to external customers through its Enterprise Systems Business.)

The other side of EDI is receiving purchase orders from customers. "We're doing that with 800 customers and distributors [about 37 percent of orders], and that number is growing daily," Murphree said. "It gives us cost and cycle-time reduction, enables just-in-time manufacturing, eliminates order entry and reduces the number of people that handle orders."

With EDI, an order is received electronically and the system determines whether the product is in inventory. If it is, a shipping requisition is generated in the warehouse and, often, the product can be picked and packed automatically. If it needs to be manufactured, the system puts it on the schedule at the factory, and its manufacture triggers release of the shipping document. In both cases, shipment triggers customer billing. (Billing and payment are also often handled electronically.) "That process delivers about 95 percent improvement in delivery time and 80 percent reduction in the time from order entry to manufacturing," said Murphree. It also saves around $21 million a year. ■

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FINANCIAL SERVICES:
Banc One Services Corp.

Speed to market issues are more elusive for financial-services firms because their products are intangible. "The service we provide is the product," said Robert Barrett, president and COO of Banc One Services Corp. of Columbus, Ohio. Creating a new product could be as simple as adjusting the interest rate on a CD or as complex as monitoring a trust fund. "The product we're trying to bring to the customer is a function of the [IT] system's ability to support it."

Traditionally in financial services, different kinds of accounts and services have been handled by different systems, and banks were often unaware of the breadth of a customer relationship. Banc One is developing a new systems architecture to consolidate and manipulate this kind of information. "The concept [of relationship management] is by no means earthshaking," said A.D. Little's Chait. "But to companies who use it, it's been transformational. It requires different systems, different training, different help within the system, a different front end. But being able to respond to customers that way is an advantage."

Banc One's new systems architecture, developed in partnership with EDS and Nor'west Bank, includes a huge, mainframe-based repository of information and an easy-to-use PC-based front end equipped with an interactive expert system. "Those two systems communicate on a distributed, cooperative-processing basis," Barrett said. "We're using 4GLs to speed development and make the system easier to modify."

> FOURTH-GENERATION LANGUAGES GIVE US GREAT PRODUCT FLEXIBILITY. WE CAN CREATE PRODUCTS WITH ANY COMBINATION OF TERMS AND INTEREST RATES ON THE FLY."
>
> *–Robert Barrett*

Banc One's system "captures about eight times more information than current customer systems," Barrett said. "We are talking about all the customer's relationships with the bank, not just savings and checking accounts, but trusts, CDs, mortgages, auto loans."

It also captures such personal data as relationships among customers and their children's names and ages. The expert system uses this information to suggest that certain customers could benefit from certain products or services. For example, if the system knows that a customer's daughter is about to turn 16, it concludes that the customer might soon be in the market for a new car. It will therefore prompt the customer-service representative to suggest setting up an auto loan or a leasing program through the bank.

ROBERT BARRETT: *"We are talking about all the customer's relationships with the bank."*

PHOTO BY KEN FRICK

Many Banc One products are developed using table-driven parameters. This enables Banc One branches to change products as quickly as the tables can be changed, Barrett said. If customer A has checking, savings and CDs with the bank, for example, his or her interest rate on a loan will be better than that of customer B, who has no CD. "Currently, fourth-generation languages give us great product flexibility," Barrett said. "We can create products with any combination of terms and interest rates on the fly."

Products that require more than table changes take more time to develop, but Banc One is working on that. Its "next generation" of products will take advantage of object-oriented programming, Barrett said. "If the logic behind a product doesn't exist [in code], then you have to write it. Object-oriented [code] will enable us to do that much more quickly, because it's reusable."

Banc One's new system, which is being piloted in numerous branches, has been well received. "Something this large takes time to do, but speed to market is relative," Barrett said. "If you're going to bring another me-too [product] out with a small incremental advantage, you'd better do it quickly." Taking a radically different approach requires more time. In either case, Barrett said, the important issue is being first to market.

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.

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Transacting Lessons

Two words describe the latest trend in online transaction processing: open and distributed

BY ALICE LAPLANTE

Although transaction processing has been around for decades—forming the basis of enormously successful systems such as American Airlines' Sabre—mighty strides have been made in the last four years. Huge, proprietary, expensive and extremely rigid online transaction processing (OLTP) systems have gradually been replaced by a client/server architecture in an open-systems environment. What makes this possible is the emergence of small, highly charged super servers and Unix workstations, as well as a maturing of client/server technologies and techniques. As a result, more companies can now afford the more flexible and efficient transaction-processing systems that increasingly form the basis of many businesses' money-making operations.

Massachusetts Mutual Life Insurance Co. is a prime example. In order to keep costs down while increasing efficiency and customer satisfaction, it moved its mammoth life- and health-claims OLTP system from a propriety and centralized mainframe platform to a distributed environment, using new tools and technologies from Digital Equipment Corp. to split processing between its Springfield, Mass., headquarters and a new site in Ireland. The new distributed system—built using DEC's distributed ACMS OLTP environment—improved response time from weeks to days. MassMutual realized tremendous cost savings and a 40 percent improvement in worker productivity.

In its simplest form, a transaction involves two or more related changes to a database. To guarantee that the transaction is successful, all prescribed changes must take place and be verified before its completion. A favorite industry acronym is ACID (for atomicity, consistency, isolation and durability), and all OLTP applications must pass the ACID test.

Atomicity is an all-or-nothing phenomenon. The transaction is not recorded unless all of a prescribed chain of events occurs. "The smallest visible unit of change is the entire transaction, and incomplete transactions are not allowed," said John Tank, commercial Unix marketing manager for DEC in Nashua, N.H.

Consistency requires that matters in an OLTP system always remain uniform and, if a transaction is aborted in the middle, that both ends reflect the same information. "If the system goes down in the middle of a banking transaction,... the application will [never] have credited one account without having debited the other," said Tank.

Isolation makes each record in the database available for only one transaction at a time. This prevents a record from receiving conflicting directions.

Finally, durability means that if the system crashes during a transaction, it will reset itself and return to the same place without losing instructions or information. Fault tolerance is an absolute necessity for OLTP systems because it allows applications to keep running even if a hardware component fails. Stratus Computer Inc. of Marlboro, Mass., recently announced a family of nine RISC-based fault-tolerant computers with a choice of operating systems that have been tailored for OLTP sys-

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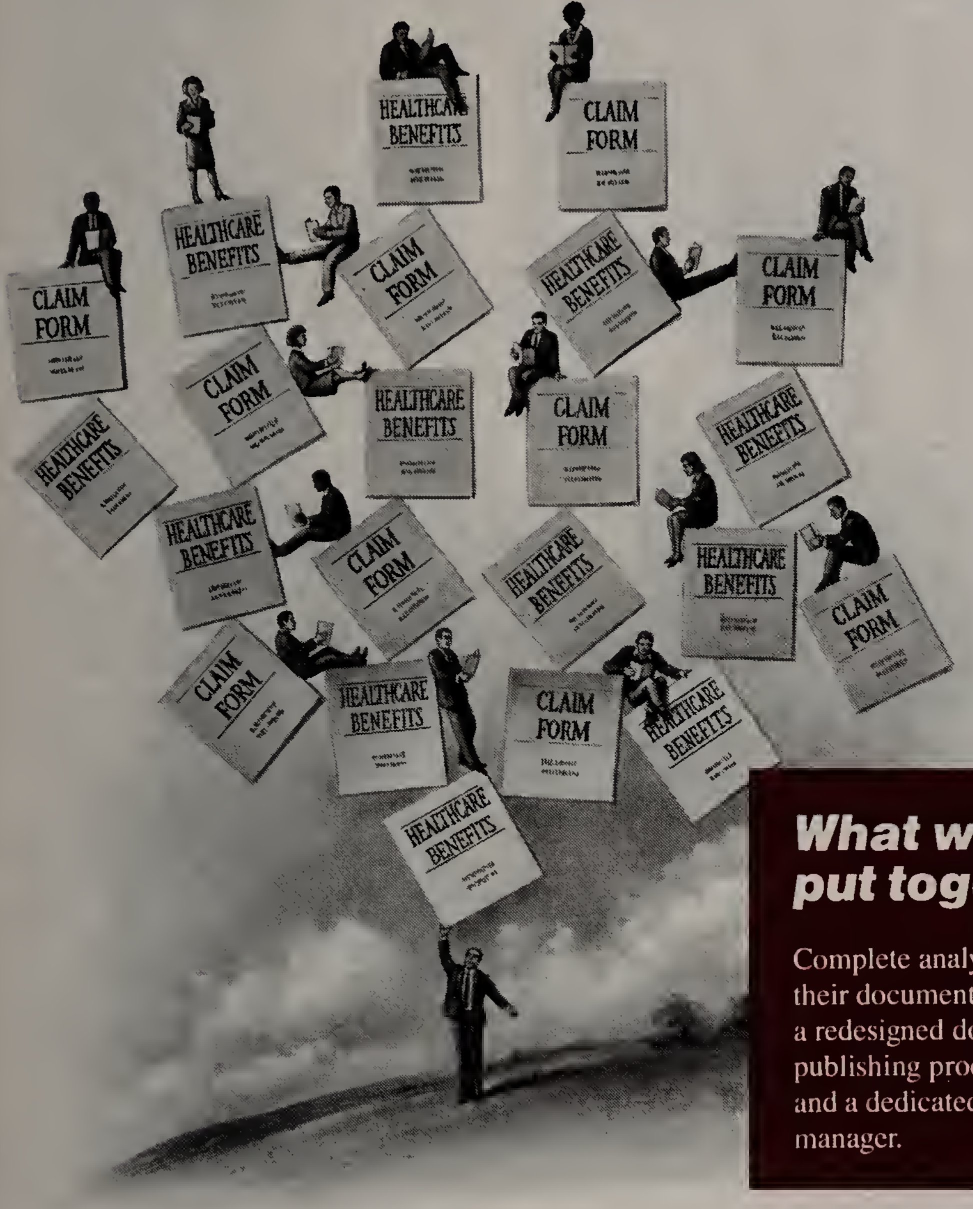

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tems and other forms of continuously available computing. OLTP systems and applications are the major market for Tandem Computers Inc. in Cupertino, Calif., which offers two families of fault-tolerant systems: NonStop, based on Guardian operating systems software, and Integrity, based on Unix.

The purpose of OLTP systems is to optimize the performance of systems doing well-defined, repetitive tasks, according to Dennis Roberson, vice president of corporate software for DEC. "In many ways, OLTP can be described as a style of computing that details how you interact with the computer and how reliable that interaction needs to be," he said.

"These are properties that require a great deal of computing power," said Tank. But with the advent of smaller and more powerful desktop and server technology, even OLTP applications processing upwards of 1,000 transactions a second can now be distributed.

"OLTP is gradually expanding downward," said Tank. "The software is much cheaper, and it's increasingly possible to build a transaction-processing system for very little money."

Corporations must consider several factors before deciding if their OLTP application can be distributed, said Tank. One of these is the expected peak transaction rate. A high-end OLTP system like Sabre processes more than 2,000 transactions per second; a mid-range system, such as a hospital patient-records system, may process 20 per second, and a low-end system can process only one transaction per second.

CIOs must also estimate the cost of a lost transaction. For an airline, that equals a lost ticket sale—anywhere from $250 to $2,000. For a candy manufacturer, a lost transaction would be, on average, less than $100. Together, these two factors will determine how much processing power is needed and whether a distributed system is possible.

Generally, an OLTP system consists of three pieces: a transaction monitor that enables the tying together of functions that define a complete transaction, the database management system, and the application itself, which sits on top of the monitor and DBMS. While it is possible to write an OLTP application without a monitor, that piece provides essential functionality that would otherwise need to be coded from scratch.

Longtime players such as NCR and DEC have joined a number of small start-ups, as well as AT&T spin-off Unix Systems Laboratories, in providing tools that enable the rapid, cost-effective development of OLTP applications across a broad spectrum of platforms.

The purpose of OLTP systems is to optimize the performance of systems doing well-defined, repetitive tasks.

The first commercially available Unix OLTP monitor came from Unix Systems Laboratories, in Summit, N.J. Called Tuxedo, the system had been used internally at AT&T and associated companies since the late 1970s. Currently available for over 20 hardware platforms and nine operating systems, Tuxedo has a widespread installed base throughout the world.

NCR's San Diego facilities recently began delivering the company's Top End monitor for its NCR System 3000 family. Last May NCR announced that Top End would be ported to IBM, Sun, Hewlett-Packard and Pyramid platforms.

The product provides a flexible, distributed, standards-based transaction-management environment for open systems. It offers open interfaces for OLTP applications and supports the X/Open Resource Manager interface (XA) to communicate with leading databases such as Informix, Oracle, Sybase and Teradata. Top End was chosen as the strategic transaction-monitor product when NCR and AT&T announced their converged product line last summer.

Top End's success is due in part to its full battery of administrative tools for the Unix environment. "One thing that has traditionally slowed the move to open systems has been the lack of administrative tools that allow the MIS professional to control the entire enterprise," said Randy Smerik, product development manager for Top End. He said the inclusion of such tools in the NCR product has made easier the decision to move to an open, distributed environment.

Pittsburgh-based Transarc Corp. recently announced its own OLTP transaction monitor for open systems. Because of the company's close links to the Open Software Foundation (OSF), Transarc's products have received considerable attention. The OSF's Distributed Computing Environment (DCE) represents a landmark in client/server computing and has been a boon to corporations interested in distributed OLTP application development. To date, most major systems vendors have committed to building and delivering DCE-compatible products within the next 12 to 36 months.

Transarc was a leader in developing the DCE specifications and a member of the team on whose proposal the DCE architecture and much of the technology is based. Indeed, Transarc provided much of the key data and file-server management components of the DCE, including the distributed file service and the local file system, which is a POSIX-compliant, log-based physical file system for server restarts.

In September 1991, in conjunction with OSF's announcement of DCE, Transarc announced a source-code release of its Encina products for OLTP. The Encina family's six initial products included:

The Toolkit: a collection of services supporting client/server applications that utilize OLTP concepts.

The Monitor: a development and execution environment for programming and integrating distributed OLTP applications that provides security, load-balancing and load-scheduling on heterogeneous platforms.

The Structured File Service: a record-

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today's fast-moving, highly competiti
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INVESTMENT
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nstead, prudent clients focus on evolu-
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no reason to throw away existing sys-
tems when there's always technology
that integrate the old with the new.

oriented file system that provides transactional integrity and log-based recovery.

Peer-to-Peer Communications Services: interoperability services for customers who want to use peer-to-peer protocols over TCP/IP and SNA transports that deliver LU6.2 sync-level 2 services.

The Encina family is currently being marketed to computer manufacturers and OEMs, who will bundle it with hardware systems.

In early 1992 Transarc announced its DCE Developers Kit, which includes tools necessary for porting existing applications or for developing new applications based on the DCE. It is available for Sun SPARCstations running SunOS 4.1.2 or IBM RISC System/6000s running AIX 3.2. In addition IBM, NEC and HP have licensed Transarc technology for use in their products.

DEC has also emerged as a major player in the distributed OLTP market. Its Application Control and Management System (ACMS) is a software environment long used to develop, execute and maintain OLTP applications in the proprietary DEC world; now DECtp, or desktop ACMS, does this in a client/server, multivendor environment. DECtp allows applications written on a number of desktop systems, including DOS, Windows, Macintosh, ULTRIX, SCO Unix and VMS workstations, to communicate with ACMS servers. DEC plans to add to the number of clients and servers supported by ACMS.

DEC also recently announced TPframe software, a Unix-based transaction-processing environment that bundles Tuxedo with Digital's ULTRIX/SQL relational database, which incorporates technology from Ingres and runs on the ULTRIX operating system. TPframe is designed for customers who have committed to Tuxedo and want to design low-cost departmental or branch-level OLTP applications that must tie into larger enterprises. Although the initial release of TPframe supports a single host system, Digital plans to make it available soon in a multiple-host distributed client/server version. Some code is included in the TPframe product in order to get developers up and running as soon as possible.

A distributed OLTP system offers the same advantages as any downsized, multivendor computer operation: greater flexibility and dramatically reduced costs.

"Users want to be free of their hardware vendor, and they are increasingly looking for solutions that can run across multiple platforms," said John Schiller, manager of marketing strategy for Transarc. "If a better piece of equipment comes along, users want to know they can swap out boxes, and that the application they wrote will continue to work."

> *With the advent of smaller and more powerful desktop and server technology, even OLTP applications processing upwards of 1,000 transactions a second can now be distributed.*

Another advantage to a distributed environment: If one machine goes down, the company can still function. "But if your mainframe crashes, everything stops," said Jeff Stern, vice president of marketing at Independence Technologies Inc., in Fremont, Calif., which develops and distributes transaction-processing monitors and end-user tools for the distributed computing environment.

Such tools mean that end users need not know the technical details of their transaction monitor or database. Yet they provide a level of abstraction for the application developer that greatly increases efficiency. Independence Technology's iTRAN ToolKit consists of eight software tools based on C and C++ that simplify and accelerate the development of distributed transaction-processing solutions. Platforms currently supported by iTRAN include Data General Aviion, HP 9000 RISC systems, MIPS workstations, Pyramid's RISC architecture, Sequent Symmetry and Sun 3 and 4.

"Four years ago, when we announced we were focusing on transaction processing in a distributed Unix environment, everyone thought we were crazy," said Stern. "Now everyone seems to be jumping on the bandwagon."

According to Stern's "five rules of independence" for a successful transaction-processing system, users should be able to:

- Employ any combination of host and client/server systems
- Interchange Oracle, Sybase, Ingres or any other SQL-based product for their database engine
- Write to any networking interface without worrying about incompatibilities
- Choose their interface, whether Open Look or Motif
- Move freely between transaction monitors such as Top End and Tuxedo.

"Hopefully, we will get to the point where users will be able to interchange monitors for the same application," said Stern.

The next year will see further expansion of the tools and technologies available to corporations interested in distributed OLTP options. "Almost every major hardware vendor is poised to deliver a distributed computing environment," said Transarc's Schiller. Although it will take time for the DCE to become prevalent in most commercial IS shops, the financial and business payoffs are to the point where in the next five to six years, CIOs can expect to see a lot of activity in this arena.

"The price performance is certainly there, and the technology for interconnecting these dispersed systems is finally coming into place," said DEC's Roberson. "CIOs need to ask themselves whether this might not be the best approach in a rapidly changing business world." CIO

Alice LaPlante is a freelance writer based in Palo Alto, Calif.

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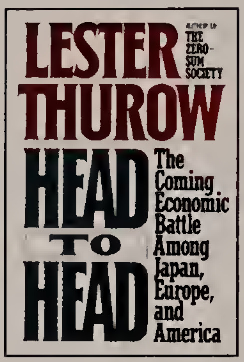
OFF THE SHELF

HEAD TO HEAD

By Lester Thurow
William Morrow and Co.
(New York), 1992
336 pages, $25


LESTER THUROW
Author of The Zero-Sum Society
HEAD TO HEAD
The Coming Economic Battle Among Japan, Europe, and America

When he lectures, Lester Thurow resembles an old school debater: He states his argument briefly and cogently, buttressed by a tumult of facts (no doubt collected on a well-indexed stack of 3x5 cards). Unfortunately, Thurow writes the way he lectures. In his latest book, *Head to Head*, his paragraphs sometimes drown in an excess of facts no reader could possibly remember, much less verify. And his fact-slinging hides another voice lurking in topic sentences and summaries—a somewhat ironic Cassandra.

Now that the Communist bear has been tamed, writes Thurow, dean of the Sloan School of Management at MIT, Americans face another war: an economic one. The world is breaking up into managed trading blocks, and the competition between regions will be fierce.

In the first three decades after World War II, America dominated the economic landscape; our vast markets accommodated imports; it was a win-win global economy. But the world grew up. Competition is now head to head, and somebody is going to lose. Guess who Thurow thinks that will be?

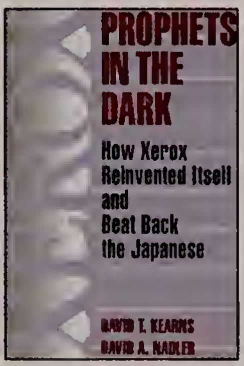
In order to be fair, Thurow looks in equal measure at the strengths and weaknesses of Japan, an integrated Europe and the United States. Japan cannot continue to be an export-driven economy for long, he notes, and the transition to a domestic-driven economy will be tricky. European integration won't be easy, either—although Thurow is more sanguine about the Old World's chance of pulling this off than many observers. (In fact, he believes that Europe is likely to be the real economic winner in the 21st century.) Throughout, Thurow contrasts the United States with its major competitors, a comparison that works much to our disadvantage.

But the dean offers us a game plan for turning the tables: Write tax laws to encourage individuals to save more and consume less; introduce incentives for investment; boost government budgets for public investment. At the same time, we should push for strong educational reform and reformulate financial rules to wean companies away from short-term perspectives. Finally, Thurow writes, we need to write a strategic trade policy and, possibly, an industrial policy for the United States. In this way we might—just might—be able to retain our position in the global marketplace.

PROPHETS IN THE DARK

How Xerox Reinvented Itself and Beat Back the Japanese

By David T. Kearns and
David A. Nadler
HarperCollins Publishers Inc.
(New York), 1992
334 pages, $22.50



Prophets in the Dark, written by former Xerox CEO David Kearns with consultant David Nadler, is an up-close and personal look at a major organization in its passage from modest startup to formidable powerhouse to tottering behemoth to reengineered quality leader.

The '60s were a decade of phenomenal growth for Xerox. Between 1959 and 1968 sales soared from $32 million to $1.125 billion, and by 1966 its staff had grown from 900 to 24,000. Since Xerox was the world's only producer of plain-paper photocopiers, its operations didn't have to be top-notch—and they weren't. "As the years rolled by, the odds that an order was correct grew very, very low," writes Kearns.

In the '70s Xerox became much more centralized and less market-driven, and a new cadre of managers "introduced rigid controls and a sense of authoritarianism." Still the company thrived; but it became a victim of its own success, according to Kearns. Top management concluded that "these practices led to their success, when in fact they succeeded despite them."

Then the FTC charged Xerox with monopolizing the copier industry, damaging the company's image and opening the door for private antitrust suits. After the dust cleared, many millions of dollars later, Xerox faced both domestic and foreign competition. But "the real problems that afflicted us...were that we had lost touch with our customers, had the wrong cost base, and had inadequate products."

In the first few years of the '80s, Xerox laid off 12,000 people and began restructuring into strategic business units. Yet "we were still being eaten alive," Kearns writes. "We had done all the enlightened management things, even the unthinkable like the massive layoffs. We changed some senior managers. And the business stubbornly wouldn't respond."

Hoping to reverse its fortunes through an all-out quality effort, Xerox established the post of corporate quality officer and a quality implementation team and set a four-year timetable in which to effect the transformation. The initiative paid off: In 1989 Xerox won the Baldrige Award.

The author is forthcoming about the events at Xerox both before and during his reign. While Kearns' first-person narrative style helps create a sense of immediacy and drama, at times it works to the book's disadvantage, particularly in the early chapters when he goes into excruciating detail about his pre-Xerox professional life and the events surrounding his hiring. But the book settles down after a while, and it is an engrossing tale. *Prophets in the Dark* is a must read for anyone interested in achieving quality.

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